URISYS 2400

Operator's Manual

Version 1.0

Revision History

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1.0	April 2001

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Edition notice

URISYS 2400 Operator's Manual

This manual is for users of the URISYS 2400.

Every effort has been made to ensure that all the information contained in this manual is correct at the time of printing. However, Roche Diagnostics GmbH reserves the right to make any changes necessary without notice as part of ongoing product development.

Any customer modification to the instrument will render the warranty or service agreement null and void.

Intended use

The URISYS 2400 is a fully automated urinalysis system intended for *in vitro* qualitative or semi-quantitative determination of urine analytes, including pH, leukocytes, nitrite, protein, glucose, ketones, urobilinogen, bilirubin, and erythrocytes.

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Instrument approvals

The URISYS 2400 analyzer meets the requirements stated in Directive 98/79/EC of the European Parliament and the Council of the European Union (EU) on in vitro diagnostic medical devices. Furthermore, the URISYS 2400 analyzer is manufactured and tested according to International Standard IEC 1010-1, "Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1: General requirements". This International Standard is equivalent to the standards UL 3101-1 for the USA, CSA C 22.2 No. 1010.1 for Canada, and DIN EN 61010-1 for Germany.

The URISYS 2400 fulfils the EMC immunity requirements for laboratory use equipment in industrial areas, according to the EMC standards EN 50082-2 and EN 61326-A1. According to EN 55011, the URISYS 2400 analyzer is a device of limit class A.

Compliance is demonstrated by the following marks:

CE — Complies with the IVD directive 98/79/EC.

c UL us — Issued by Underwriters Laboratories, Inc. (UL) for Canada and the US.

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Warranty

Refer to the URISYS 2400 analyzer purchase agreement for warranty conditions. Contact your local Roche Technical Support for further information.

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Preface

The URISYS 2400 analyzer is a fully automated, benchtop urine analyzer. It is designed for use with URISYS 2400 cassettes.

The URISYS 2400 is optimized for workloads of between 100 and 1000 urine samples per day. Only trained personnel working in a professional laboratory environment must operate the URISYS 2400. The analyzer has been developed and designed to assay urine samples only.

It is important that the operator reads this manual thoroughly before using the analyzer.

Any disregard of the instructions in the Operator's Manual may result in a safety risk.

How to use this manual

This manual is designed to help you perform all tasks required as part of your work with the URISYS 2400.

Content

The manual is divided into the following parts:

- **Part A – Overview:** The overview provides general information about the URISYS 2400 analyzer and specific details about the safety precautions.
- **Part B – System description:** The system description outlines the hardware and software components of the analyzer, the installation procedure, and the use of the touch screen.
- **Part C – Operation:** This section defines the daily and special operations of the URISYS 2400 analyzer in a step-by-step guide.
- **Part D – Maintenance:** This section provides details on all of the general maintenance actions.
- **Part E – Troubleshooting:** This section contains information on how to respond to data and instrument alarms, and provides troubleshooting guidelines for alarms that cannot be solved by the operator. Alarms that require intervention by trained Roche Technical Support personnel are indicated.
- **Part F – Appendix:** This section contains additional information, including technical specifications, glossary, and index.

Conventions used in this manual

Visual cues are used to help locate and interpret information in this manual quickly. This section explains formatting conventions used in this manual.

Symbols The following symbols are used:

Symbol	Used for
►	Procedural step
•	List item
👁	Cross-reference
💡	Note and tip
[Parameter]	Name of screen (enclosed in brackets)
<Start>	Name of button (enclosed in less and greater)

Abbreviations The following abbreviations are used:

Abbreviation	Definition
A	
ASCII	American Standard Code for Information Interchange
B	
BIL	Bilirubin
C	
CCD	Charge-coupled device
C/D	Check digit
CLA	Clarity
COL	Color
COM	Compensation pad
COMM.Parameter	Communication parameters for host-communication available on the [System Parameters] screen
E	
EMC	Electromagnetic Compatibility
EN	European Standard
ERY	Erythrocytes
G	
GLU	Glucose

Abbreviation	Definition
I	
ID	Identification number
IEC	International Electrotechnical Commission
K	
KET	Ketones
L	
LED	Light Emitting Diode
LEU	Leukocytes
L.TRB	Lightly turbid
N	
NEG	Negative
NIT	Nitrite
nm	Nanometer
NORM	Normal
O	
ORANG	Orange
P	
P.YEL	Pale Yellow
POS	Positive
PRO	Protein
S	
SG	Specific Gravity
SI	Standard International
T	
TS	Test strip
TURBD	Turbid
U	
UBG	Urobilinogen
Y	
YELLO	Yellow

Safety classifications

Before operating with the URISYS 2400 it is essential that the warnings, cautions, and safety requirements contained in this manual are read and understood by the user. This section explains how precautionary information is formatted in the manual.

The safety precautions and important user notes are classified according to ANSI Z535 standards. Familiarize yourself with the following meanings and icons:



Warning
Indicates a possibly hazardous situation which, if not avoided, may result in death or serious injury.
Examples of a "serious injury" include loss of eyesight, burn (high temperature, low temperature), electric shock, bone fracture, or poisoning. These injuries require medical assistance.



Biohazard
Samples containing material of human origin must be treated as potentially infectious. The relevant laboratory guidelines on safe use must be observed.



Caution
Indicates a possibly hazardous situation which, if not avoided, may result in slight or minor injuries, and/or damage to equipment.
"Minor injury" refers to injuries that may require medical assistance.
"Equipment" refers to extended damage to buildings, furniture, and so on.



Spillage
Avoid all liquid spills on the analyzer.

Safety information



Electrical safety
Connect the analyzer to grounded power outlets only (protection class 1). All peripheral devices that are connected to the URISYS 2400 must comply with safety standard IEC 950 (UL 1950) for information technology equipment, or with IEC 1010 (UL 3101) for laboratory use instruments.

Instrument in use
Keep hands or other objects away from the sampling probe area to prevent personal injury while the instrument is in use. Do not touch parts of the analyzer other than those specified.

User qualification
Only appropriately trained operators are qualified to operate the analyzer.

Correct use
Any disregard of the instructions in the Operator's Manual may result in a safety risk. Use the URISYS 2400 analyzer to analyze urine samples only. It is not intended for any other application.

Transport
At least two persons must carry the analyzer, by holding the baseplates on the left side and right side of the analyzer. Be careful not to hurt your hands or fingers when putting the analyzer in place.

Environmental conditions
The URISYS 2400 is approved for indoor use only.



Biological safety
Liquid waste and strip waste are potentially biologically hazardous. Always wear gloves if handling those materials. Do not touch parts of the analyzer other than those specified. Consult your laboratory protocol for handling biohazardous materials.



Spilling and cleaning
If a sample is spilled on the analyzer, wipe up immediately and apply disinfectant. When handling the washing solution, ensure that you wear gloves and safety goggles to avoid direct contact with the solution. If the solution contacts the body, wash immediately with a large volume of water. Consult your laboratory protocol for handling biohazardous materials.



Radio interference
URISYS 2400 is a class A device. In residential areas it may cause radio interference. The user must take precautions as required.

Installation
Follow the specified installation conditions carefully. Otherwise, inaccurate results, or damage to the analyzer may occur.

Waste
Handle liquid waste and used test strips properly, according to legislation on water pollution, and on the treatment of drainage and waste matter.

Electromagnetic waves
Devices that emit electromagnetic waves may affect measured data, or cause the analyzer to malfunction. Do not operate the following devices in the same room where the analyzer is installed: mobile phone, transceiver, cordless phone, other electrical devices that generate electromagnetic waves.

- ***Operating and maintenance***
  Carefully follow the procedures specified in the Operator's Manual for the operation and maintenance of the analyzer. Leave maintenance of other areas to trained Roche Technical Support personnel.
- ***Calibration***
  Calibrate the analyzer every four weeks to ensure the analyzer operates optimally. Failure to do so may lead to inaccurate results.



- ***Test strips***
  Handle and store test strips according to the instructions provided by Roche Diagnostics. Refer to the instructions in the package insert of the URISYS 2400 cassette.
- *Particular care must be taken when performing the following procedures:*
  Preparing and processing samples (routine, STAT and control)
  Using the washing solution
  Draining the liquid waste tank
  Cleaning the TS transfer base
  Disposing of used test strips
  Cleaning the waste box

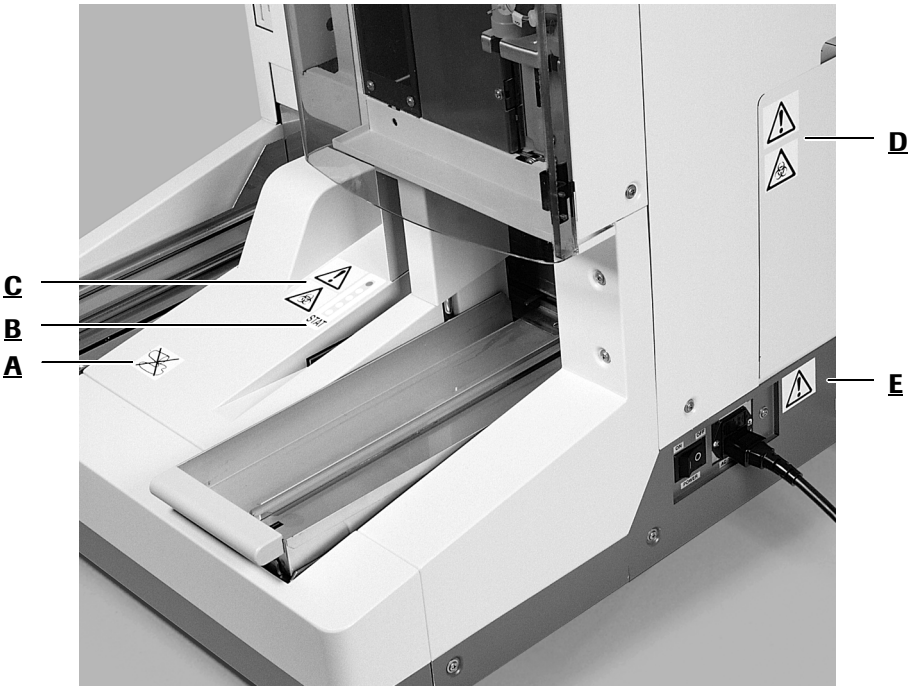


Figure 0-1 URISYS 2400 analyzer with labels

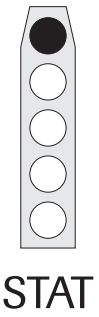
A *Housing*

B *STAT sample position*

C *Housing before sampling area*

D *Strip waste container door*

E *Power supply*

Symbol	Validity	Symbol	Validity
	• STAT position • Rack transfer • Waste box • TS transfer base • Power supply		• STAT position • Rack transfer
	• Sampling probe • Rack transfer • Rinsing station • Waste box • TS transfer base		• STAT sample position

Overview A

Part A is an overview of the URISYS 2400.

Introduction to the system

This chapter contains an introduction to the URISYS 2400 analyzer.

In this chapter *Chapter* **1**

Description of the URISYS 2400 analyzer 2
Measuring principle 2

Description of the URISYS 2400 analyzer

The URISYS 2400 analyzer is a fully automated urinalysis system intended for *in vitro* qualitative or semi-quantitative determination of urine analytes, including pH, leukocytes, nitrite, protein, glucose, ketones, urobilinogen, bilirubin, and erythrocytes. In addition, the analyzer determines specific gravity, color, and clarity. The URISYS 2400 is intended for professional use only.

The primary functions of the URISYS 2400 analyzer include:

- Sample identification
- Automatic dispensing of test strips
- Robotic pipetting of samples
- Controlled incubation period
- Photometric measurements
- Result memory
- Optional formats for data output

The URISYS 2400 analyzer uses the URISYS 2400 cassette containing 400 test strips. Each test strip has ten individual test pads that are used to test for different substances or characteristics. The test strips are analyzed as they move automatically through the analyzer. One strip is used per sample. When a strip is dispensed for use, an aliquot of the urine sample is pipetted onto each of the test pads. The test results are based on the measurement of reflected light intensity. The specific gravity, color, and clarity of each sample are also measured.

Measuring principle

The URISYS 2400 is a fully automated reflectance photometer for *in vitro* semi-quantitative measurements of urine test strips. The light sources (LED's [light-emitting diodes]) and reading times are optimized for the reaction chemistry and color development that occur on the test pads.

The measuring head of the URISYS 2400 contains LED's of three different wavelengths. The test strip remains stationary at the measuring position as the measuring head moves over each test pad. Measurement starts at the reference plate, which is used to test the optical system.

The URISYS 2400 verifies that the test strip is properly positioned under the measuring head, by measuring the reflected light. If a test strip is not properly positioned under the measuring head, the URISYS 2400 displays a message.

Reflected light is measured electro-optically, and the process is illustrated in the following figure.

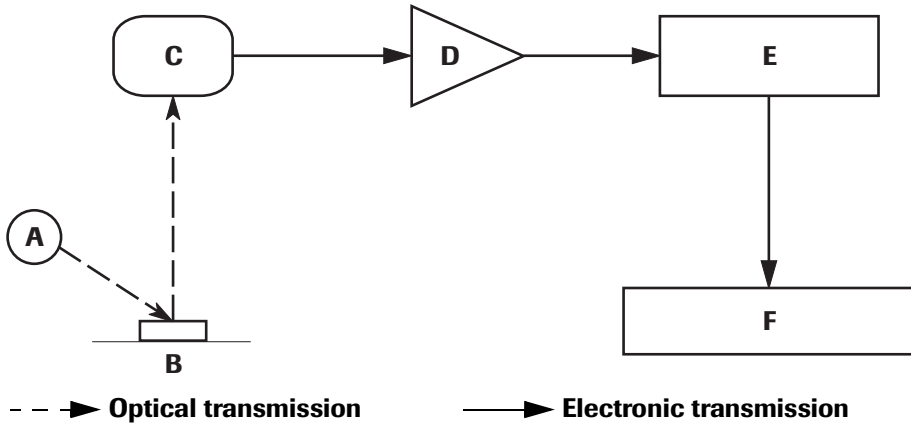


Figure A-1 Process of measuring

A *LED*

B *Test pad*

C *Photodiode detector*

D *Analog-to-digital converter*

E *Microprocessor*

F *Concentration result*

An LED (**A**) transmits light of a defined wavelength, at an optimum angle, onto the surface of a test pad (**B**). The light hits the surface of the test pad and is reflected with an intensity that is dependent on the color of the test pad.

A photodiode detector (**C**), positioned directly above the test pad, receives the reflected light. The photodiode detector transmits an analog electrical signal to the analog-to-digital converter (**D**), which changes the analog signal to a digital value.

A microprocessor (**E**) adjusts the digital value, based on a value from an internal reference plate. It converts the digital value to a relative value by using a calibration standard scale. Then, the microprocessor calculates a reflectance value.

The semi-quantitative concentration result (**F**) is determined by comparing the reflectance value with the so-called range limits (parameter-specific reflectance values stored in the analyzer). The full list of concentration range values for all test parameters is shown in:

Table F-1 on page F-5

The results are stored in the memory and can be printed, saved to a diskette, or sent to another computer.

Each of the three LED's transmits light of a different wavelength. The use of different wavelengths improves the results that are obtained from measuring each of the test strip parameters. The wavelengths used to measure the different parameters are listed in the table below.

Test parameter	Measuring wavelength (nm)
pH	555, 620
Leukocytes	555
Nitrite	555
Protein	555
Glucose	555
Ketones	555
Urobilinogen	555
Bilirubin	555
Erythrocytes	555, 620
Color	470, 555, 620

Table A-1 Wavelengths used to measure the reflectance values

The photometric reflectance measurement for all of the test parameters is performed after an incubation time of 60 seconds. As with previous urine analyzers from Roche Diagnostics, compensation for intrinsic urinary color, which is a recognized interfering factor, is made through the measurement of a blank compensation pad on the test strip. The compensation pad assists in the prevention of false positives when a urine sample is strongly colored.

The URISYS 2400 determines the urine color by evaluating the reflectance values of all three measuring wavelengths (470 nm, 555 nm, and 620 nm) on the compensation pad. Color results are reported as PALE YELLOW, YELLOW, AMBER, BROWN, ORANGE, RED, GREEN, or OTHERS.

The measurement of specific gravity (SG) is performed in a flow cell that is filled with a urine sample during aspiration of the sample. An LED (650 nm) transmits light to the flow cell. A charge-coupled device (CCD) determines the angle of total reflection. The refractive index of the sample is calculated from the angle of total reflection using a calibration curve. Transformation into the SG value is performed by a nomogram stored in the analyzer.

The flow cell that is used to measure specific gravity also determines the clarity of the sample. However, light of a different LED is used to measure clarity. This LED (660 nm) transmits light to the flow cell, and the amount of light that passes through the flow cell is measured.

The system is blanked (zeroed) during the washing process, between sample measurements, by setting the water transmission to 100%. The transmission values of samples are transformed to clarity results (CLEAR, LIGHT TURBID or TURBID), by using the clarity range table that is programmed in the software of the URISYS 2400.

When a sample has been pipetted onto the test pads of a test strip, and the specific gravity and clarity have been measured, the remaining urine is ejected into the rinse station. The needle and the flow cell are washed with water before the next sample is taken.

System description B

Part B is the system description of the URISYS 2400.

Hardware

This chapter contains the description of the system hardware.

In this chapter *Chapter* **2**

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Standard accessories 4
Additional items 5
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Basic requirements 5
Surface and space measurements 5
Power supply 6
Water supply 6
Assemble the parts 7
Set up the water supply tank 7
Liquid waste tank 8
TS transfer base 8
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External host connection 9
Environmental conditions 10

Hardware description

The URISYS 2400 analyzer consists of several major components:

- Rack transport system
- Liquid handling system
- Test strip cassette compartment
- Automated test strip processing area
- 3-wavelength reflectance photometer
- Combined, flow-through refracto-/turbidimeter
- User interface screen
- Inbuilt computer
- Battery-buffered memory
- Diskette drive (for MS-DOS compatible diskettes)

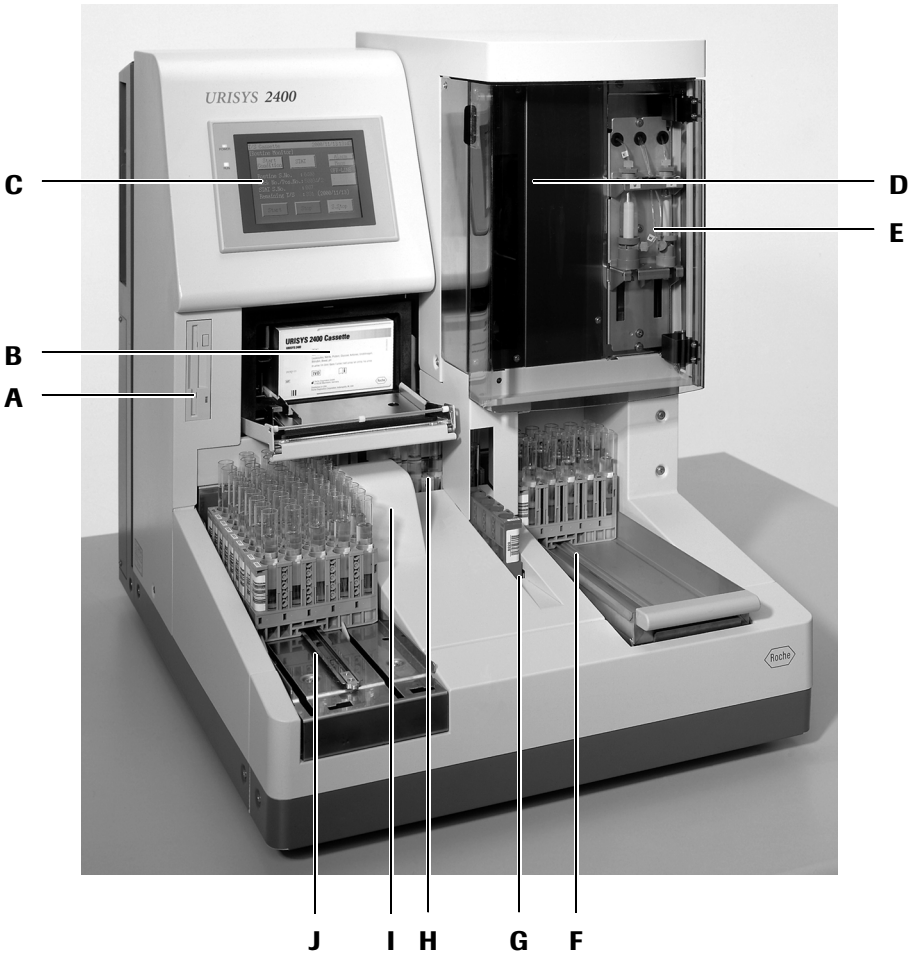

Figure B-1 The URISYS 2400 analyzer

A *Diskette drive*

B *URISYS 2400 test strip cassette compartment*

C *Touch screen*

D *Pipette mechanism*

E *Wash and sample syringes*

F *Rack output line*

G *STAT sampling position*

H *Rack cross-feed line*

I *Barcode reader*

J *Rack input line*

Standard accessories

The standard accessories that accompany the URISYS 2400 analyzer are:

- Water supply tank with a liquid level detector
- Water supply tube with filter
- Two rack trays
- Liquid waste tube 5 m (16.4 ft) length
- Strip waste container
- Standard maintenance kit (O-rings, seals)
- Fuses
- Power cord
- Three software installation diskettes
- Operator's Manual (English version)

Water supply tank with liquid level detector

The water supply tank that supplies deionized water to the analyzer is located externally. It has a maximum capacity of 5 L (5.3 qts). This volume is sufficient to process approximately 1000 samples.

Rack trays

Two identical trays are supplied with the analyzer. Each tray holds up to 15 racks at one time. One tray is used to load the racks onto the rack input line.

The second tray is used as a stationary rack output tray during sample processing and serves to remove racks from the rack output line.

Strip waste container

Used test strips are deposited in a strip waste container that has a minimum capacity of 420 test strips. (The capacity is calculated on the basis of the contents of one URISYS 2400 cassette plus a safety margin.)

The strip waste container is located on the right side of the analyzer, behind the door panel. The container is designed to minimize the contact an operator has with potentially infectious and toxic materials.

When the strip waste container is full, a message is displayed on the touch screen.

Additional items

Items that are necessary or optional for the installation and operation of the URISYS 2400 analyzer, but are not supplied with the analyzer, are:

- Liquid waste tank (with or without an optional overflow sensor)
- Racks
- Sample tubes
- Washing solution
- URISYS 2400 cassette
- URISYS 2400 calibration strip
- External printer and standard printer cable (parallel/Centronics interface)
- Waste container cartons
- Serial interface (host) cable
- 1.44 MB diskette for storage of data

Installation

Read this manual carefully before installation, to ensure correct operation of the analyzer.

If you have any questions after initial installation, contact Technical Support.



Only trained Roche Technical Support personnel, or similarly qualified personnel supervised by authorized service agents of Roche Diagnostics, are qualified to install the URISYS 2400 *analyzer.*
At least two persons must carry the analyzer, by holding the baseplates on the left side and right side of the analyzer. Be careful not to hurt your hands or fingers when putting the analyzer in place.
Follow the specified installation conditions carefully. Otherwise, inaccurate results, or damage to the analyzer may occur.

Basic requirements

Surface and space measurements

The following surface and space requirements must be met for the use of the URISYS 2400 analyzer, and the proper ventilation of the analyzer when it is in use:

- 5 cm (2.0 inches) or more (rear)
- 20 cm (7.9 inches) or more (left side)
- 30 cm (11.8 inches) or more (right side)

Use a table that is able to support the mass of the analyzer, which is approximately 85 kg (187 lbs). The table must be level. Any inclination must be less than 1.5 degrees in every direction.

Power supply

A standard 230 V/50 Hz or 115 V/60 Hz power line is required to operate the analyzer. It must be connected to a grounded power supply socket (protection class 1).

Although the maximum power consumption of the instrument is 200 VA, the external power supply should fulfill the following minimum requirements to cover for peaks at switching on.

Electric power supply capacity:

- Minimum 500 VA
- Minimum 5 Amp, 3-pin power supply socket

The power switch and power supply socket are located on the right side of the analyzer.

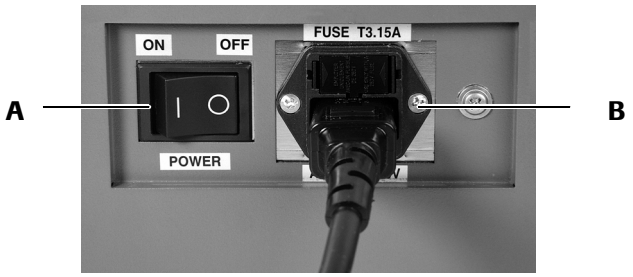

Figure B-2 Power switch and power supply socket

A *Power switch* **B** *Power supply socket*

Water supply

An external water supply tank for deionized water is supplied with the URISYS 2400. The deionized water must be germ free and have an electric conductance value that is less than or equal to 1 µS/cm.



Do not connect the analyzer directly to a pressurized water supply.

Assemble the parts

Set up the water supply tank

The external water supply tank provides water to the analyzer for washing. The tank has a volume of approximately 5 liters (5.3 quarts), which allows for the measurement of about 1000 samples.

► **To set up the water supply tank**

1. Fill the tank with deionized water.
2. Connect the cable of the liquid level detector to the water level connection on the analyzer.
3. Connect the water supply tube with filter to the water inlet connection on the analyzer.
4. Press the water tube into the slit of the rubber stopper that is on top of the liquid level detector, so the filter, at the end of the water supply tube will be long enough to reach the bottom of the tank.
5. Put both the liquid level detector and the water supply tube with filter through the opening of the tank, so the filter touches the bottom of the tank, while the level detector with rubber stopper align vertically into the tank.

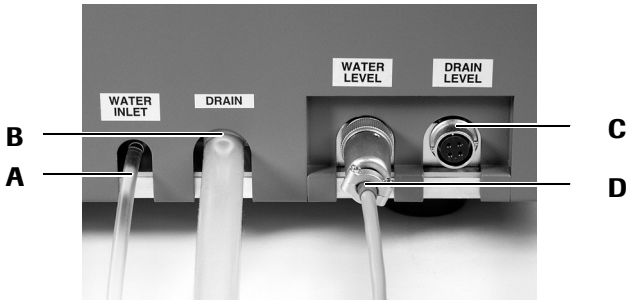

Figure B-3 Connecting the water supply tank and liquid waste tank to the analyzer

A *Water inlet connection*
B *Liquid waste tube connection*
C *Connector for water level detector*
D *Connector for liquid waste level detector*

If the water is contaminated by the growth of bacteria or algae, it may result in faulty liquid detection and rinsing in the pipetting mechanism and rinse circuits of the analyzer.

Liquid waste tank

The liquid waste tank is located outside the analyzer. The capacity of the tank depends on the specific tank that is used. The tank must have a volume of at least 5 L (5.3 qts). An overflow sensor is available as an option.

A 5 m (16.4 ft) liquid waste tube is supplied for the connection of the liquid waste tank to the analyzer.

► To set up the liquid waste tank

1. Ensure the liquid waste tank is empty before use. The liquid waste tank must be positioned well below the level of the analyzer, to allow for the reliable flow of the liquid waste into the tank.
2. Connect the liquid waste tube to the drain socket on the analyzer. If necessary, shorten the liquid waste tube to ensure smooth and even flow.
3. If an overflow sensor is used, connect it to the drain level connector on the analyzer and place it into the liquid waste tank.

TS transfer base

► To set up the TS transfer base and the strip waste container

1. Open the strip waste container door on the right side of the analyzer.
2. Insert the TS transfer base smoothly to its end position, and ensure that it is positioned correctly.



Figure B-4 Inserting the TS transfer base into the URISYS 2400 *analyzer*

3. Turn the screw on the TS transfer base until it locks to secure the base.
4. Insert a waste box carton into the strip waste container and place it into its correct position.

5 Close the strip waste container door.



Figure B-5 Installing the strip waste container

External printer

An external printer can be connected via a standard parallel interface (Centronics type).

Recommended printers are:

Country	Printer
For Japan:	EPSON VP600 FUJITSU M3388C
For Europe:	FUJITSU M3388B FUJITSU DL 3700 Pro
For USA:	FUJITSU M3388A

Table B-1 Table of recommended printers

If another type of printer is used, ensure that it is compatible with the analyzer.

External host connection

The analyzer can be connected to a host computer via a serial interface using ASTM protocol.



For specifications of serial host interfacing, contact Technical Support.

Environmental conditions

The URISYS 2400 analyzer must be used in an environment that meets the following conditions:

- Free from excessive dust
- Well-ventilated area
- Not exposed to direct sunlight
- Floor that is level (with an inclination of less than 1.5 degrees in every direction) and firm
- Table that can support the mass of the instrument, which is approximately 85 kg (187 lbs)
- Ambient temperature ranging from 15-30°C (59-86°F), with an acceptable variation of ±2°C (±3°F) during measurement
- Relative humidity ranging from 20% to 80%, without moisture condensation
- Free from vibrations
- Availability of a 3-pin power supply socket within 3 m (9.8 ft) of the analyzer
- Free from abrupt mains voltage fluctuation (±10 V)
- Well-distanced from a machine generating a high frequency voltage (for example, a centrifuge)
- Free from electromagnetic wave interference

Software

This chapter describes the URISYS 2400 software.

In this chapter *Chapter* 3

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Load 28
Save 28
Print 28

Installation

The software supplied with the analyzer supports all functions of the URISYS 2400 analyzer. Specific functions are password-protected to avoid accidental modifications.

The English software is pre-installed and ready for use on delivery of the analyzer.

In case re-installation of the software is necessary, proceed as follows.

► To install the software

1. Save the system parameters, test parameters, routine sample results, STAT sample results, control results and the alarm trace onto a diskette as safety backup.

   "Setting the parameters" on page B-16

   "Data of routine and STAT samples" on page C-21

   "Control sample data" on page C-28

   "Handle alarms" on page E-3

2. Switch off the power.
3. Insert System Disk 1 into the diskette drive.
4. Switch on the power, located on the right side of the analyzer. The [Wait] screen is displayed.
5. While the [Wait] screen is displayed, press both the lower left and lower right corners of the LCD panel simultaneously. The [System Menu] screen is displayed.
6. Press <Transmit Mode>.
7. Press <Tool Transmit>.
8. Follow the instructions on the screen to complete the installation.
9. If necessary, restore the system parameters, test parameters, routine sample results, STAT samples results, and control results from the backup diskette.

   Step 1

The URISYS 2400 touch screen

The touch screen has been designed to make navigation through the menus consistent and convenient. Press the buttons on the touch screen once to perform the various functions. Operators wearing gloves can easily use the touch screen. A special pointer can be used to operate the keyboard displayed on the touch screen, if necessary.

Basic screen composition

Generally, the status of the analyzer is indicated in the upper left of the yellow line of the main screen. There are three main status types. For information on the different status types displayed on the touch screen, see:

Table B-2 on page B-13

Other status types are displayed during special operations.

The date and time are displayed in the upper right of the screen.

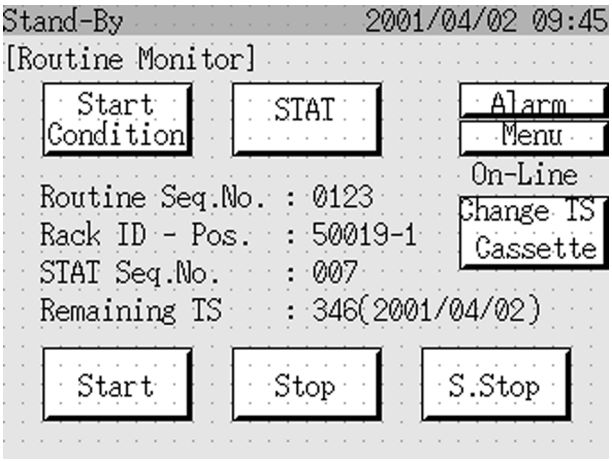

Figure B-6 Example of a touch screen

Status type	Explanation
Stand-By	The analyzer must always be in Stand-By status for the processing of data, inputting of criteria, or setting the parameters. The analyzer is idle in this status.
Operation	The analyzer processes samples in this status. This status allows the operator to load additional samples without interrupting sampling and measurement of samples currently being processed.
Sampling Stop	The status of the analyzer changes to Sampling Stop when there are no more racks on the rack input line or to S.Stop when the analyzer cannot continue with a procedure. This generally coincides with a message that indicates the reason for the stop.

Table B-2 Main status types displayed on the touch screen

Immediately below the line indicating the status of the analyzer, the name of the current screen is displayed. For example, the name of the screen displayed above is [Routine Monitor].

Figure B-6 on page B-13



Press <Home> on the initial [Copyright] screen to display the [Routine Monitor] screen.

There are a number of buttons that consistently appear on the screens. The following table summarizes these buttons and their functions.

Button	Explanation
<Home>	Press this button to display the [Routine Monitor] screen.
<Alarm>	This button flashes to signal an alarm. Press this button to read the message.
<Menu>	Press this button to display the [Menu] screen.
<PgUp>	Page up. Press this button to return to the previous screen.
<CLR>	The data entered is cleared. The CLR button only works before the Enter button is pressed.
<Cancel>	Cancels any data that has been entered and returns to the previous screen without having made any changes. The Cancel button only works before the Enter button is pressed.
<OK>	Confirms the data on-screen and proceeds to the next screen.
"<"	Press < to move through the different fields.
">"	Press > to move through the different fields.
<+>	Increases values on the touch screen.
<->	Decreases values on the touch screen.
<↵>	Enter. Press this button to confirm the newly entered data.

Table B-3 Main buttons displayed on the touch screen

As the operator navigates through the different screens, there are various windows that can appear. These serve different functions, such as confirmation of a selection. The figure shows an example:

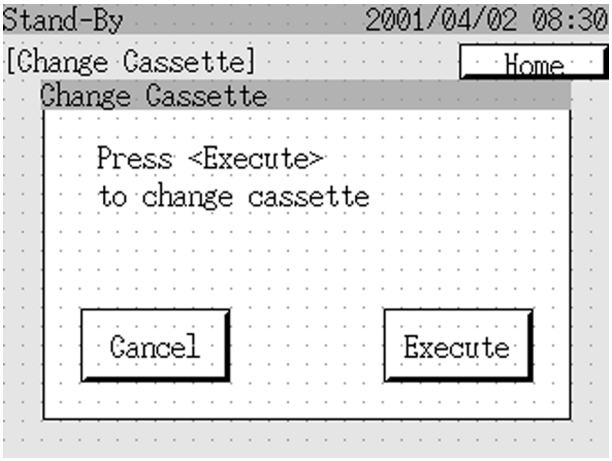

Figure B-7 Example of a window that can appear on the touch screen



Some of the buttons for selecting settings work with a toggle function.

Setting the parameters

A number of parameters can be set individually according to laboratory requirements if they deviate from the default factory settings.

The settings are automatically stored so that the data or analytical parameters do not need to be re-specified each time, except when required. They can be printed or saved to a diskette for documentation.



If any mistakes related to the consistency of values occurred during setting of parameters, the corresponding error alarm message does not appear until <Start> is pressed for starting analysis. Check the alarm and correct the settings.

The setting of parameters is only possible when the analyzer is in Stand-By status. For starting the analyzer, see:

"System start" on page C-4

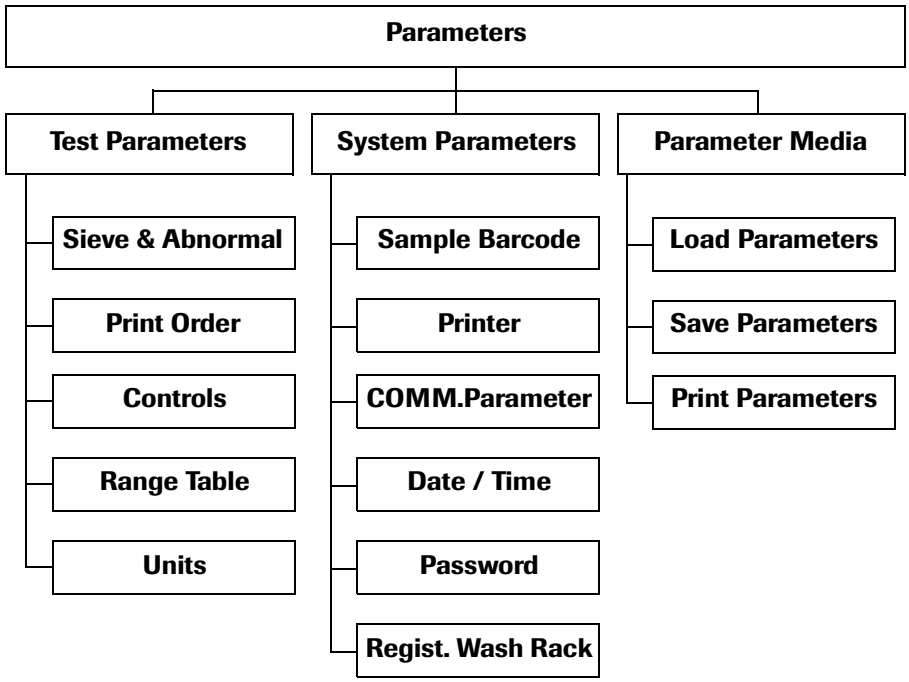

Figure B-8 System hierarchy chart of the progression through the different screens of the Parameters menu

Test parameters

► To set test parameters

1. Press <Menu> on the [Routine Monitor] screen. The [Menu] screen is displayed.
2. Press <Parameters>. The [Parameters] screen is displayed.
3. Press <Test Parameters>. The [Test Parameters] screen is displayed.
4. Press any of the following five buttons to gain access to the option you require:
   - <Sieve & Abnormal>
   - <Print Order>
   - <Controls>
   - <Range Table>
   - <Units>

Sieve and abnormal values

Use the sieve settings to define the criteria for a flag (S) on the corresponding test parameter result. These flags can be used to identify urine samples to be examined by additional methods, for example, sediment microscopy.

Use the abnormal settings to define the criteria that indicate potentially pathological values. An asterisk (*) flags the corresponding test parameter results.

The concentration values which are specified on the screen represent the lowest concentration ranges from which on the test parameter results are flagged.

For more information, see:

Table E-1 on page E-2

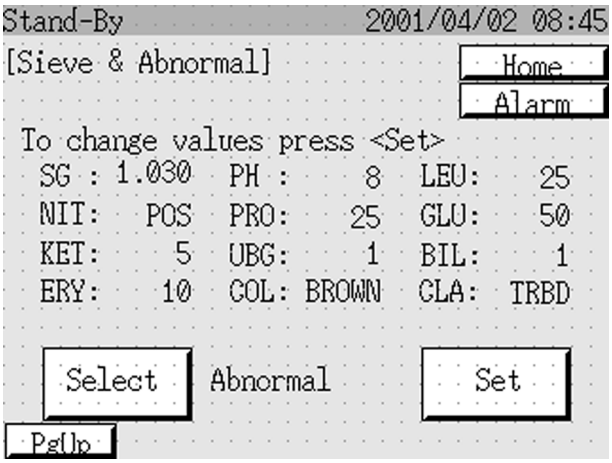

Figure B-9 Sieve & Abnormal screen

► To set the criteria for defining sieve and abnormal values

1. Press <Sieve & Abnormal> on the [Test Parameters] screen. The [Sieve & Abnormal] screen is displayed listing the sieve criteria for each test.
2. Press <Select> to change the display of the items from sieve to abnormal criteria and back.
3. Press <Set> to change the criteria. The [Password] window appears.
4. Enter the 4-digit password using the keyboard on the screen.
5. Press <Enter>. The [Sieve & Abnormal Setting] screen is displayed with both the sieve and abnormal values listed for each test parameter, beginning with specific gravity (SG).
6. Press <Test> to select another test parameter.
7. Press "<" or ">" to select sieve or abnormal settings.
8. Press <+> or <-> to select the desired concentration range.
9. Press <Enter> after each selection to accept the chosen values.
10. Press <PgUp> to return to the [Sieve & Abnormal] screen and check if the settings correspond to your requirements.
11. Press <PgUp> to return to the [Test Parameters] screen.

Print order

The operator can define the order of the test parameters on the screen and on the result printout, in order from 1 to 12. If an item is not to be printed, enter zero.

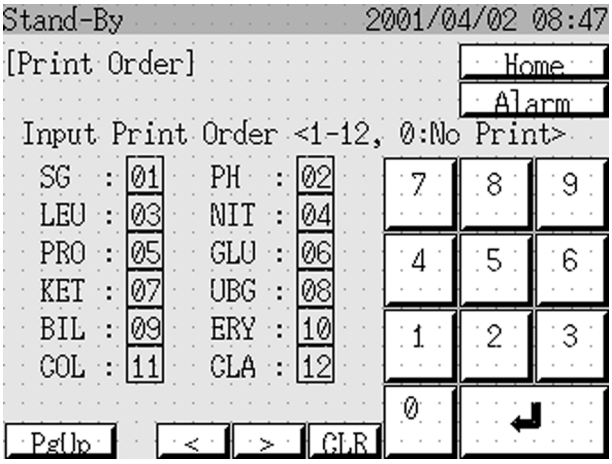

Figure B-10 Screen showing Print Order settings and options

► To set the print order

1. Press <Print Order> on the [Test Parameters] screen. The [Print Order] screen is displayed.
2. Enter the test parameter order if the requirements of the laboratory differ from the default settings.
3. Press "<" or ">" to move through the different fields.
4. Press <Enter> after each entry.
5. Press <PgUp> to return to the [Test Parameters] screen.

Controls

The operator can define the following:

- Control sample rack number
- Position of the control samples on the rack
- Control sample name
- Lot number

When the control sample rack number has been registered, the analyzer automatically recognizes this rack as a rack carrying urine control samples, and measures the samples like normal samples; however, the results are stored in a special control sample data memory.

For each specified position on the control rack, a separate memory for 100 results is available. Up to three different controls can be measured in one rack. The specified position on the rack of each control level must be used each time to avoid the mixing of results in the assigned memory.

► To specify the control rack number and control sample rack position

1. Press <Controls> on the [Test Parameters] screen. The [Controls] screen is displayed.
2. Press <Regist. Control Rack>. The [Regist. Control Rack] screen is displayed.
3. Enter the range of the control rack ID numbers in the fields provided. The control rack ID numbers must consist of five digits and overlapping ranges (for example, with routine racks) are not allowed.



If the 5-digit number of the chosen rack is not known, read and print the rack ID via the Barcode Check function (see "Checks" on page C-41).

4. Press <Enter> after each value has been entered.
5. Enter the position number on the rack for each level of control sample, for example, position one for normal level and position two for abnormal level. The input positions range from 1 to 5 on the registered rack, or zero. If a level is not to be measured, enter zero.

6 Press <Enter> after each entry.

7 Press <PgUp> to return to the [Controls] screen.

Mark the specified rack as a control rack. Do not use the control rack for routine samples, otherwise the routine sample results will be stored in the control data memory.

► To specify the control name and lot number

1 Press <Control Name/Lot No.> on the [Controls] screen. The [Control Name/Lot No.] screen is displayed.

2 Press <Level> to select a level, for example, Level 1, Level 2 or Level 3.

3 Type the name of the control material, using a maximum of 16 alphanumeric characters. Press <Enter>.

4 Type the Lot No., using a maximum of 10 digits.

5 Press <Enter> after each entry.

6 Press <Level> again to enter the Name and Lot No. for the remaining levels.

7 Repeat steps 3-5.

8 Press <PgUp> twice to return to the [Test Parameters] screen.

Range table

The operator can view the concentration ranges, reflectance values, wavelengths and compensation data for each test parameter. The operator gains access to the range and reflectance values by using the password that is supplied with the analyzer.

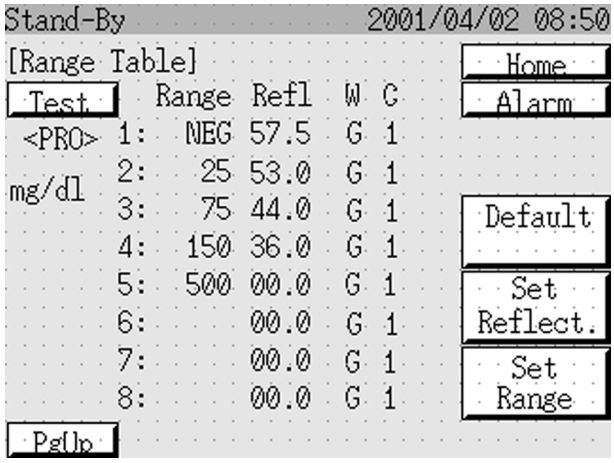

Figure B-11 Screen showing Range Table settings and options

The wavelength data (W) that are displayed are fixed values. These values cannot be changed.

The compensation data (C) designate factors for the compensation of the intrinsic urine color, for example, 0 means no color compensations. Higher numbers mean stronger compensation.

Changing ranges leads to result reports which differ from the default concentration ranges as shown in:

Table F-1 on page F-5

Changing reflectance values leads to different evaluation sensitivities of the respective test parameters. Lowering the reflectance value of the negative (NEG) range leads to a decrease of the sensitivity of the test evaluation, and vice versa. In this way, the sensitivity can be adjusted to the requirements of the individual laboratory.
The correctness of results obtained after the user has altered the ranges or reflectance values is not warranted by Roche Diagnostics. The user is responsible for validating the consistency of results after changes have been made.

The concentration ranges and reflectance values can be reset to the default values using the <Default> button.

► To change the range values

1. Press <Range Table> on the [Test Parameters] screen. The [Range Table] screen is displayed.
2. Press <Test> to select the test parameter to be viewed. For each test parameter, the range and reflectance values can be changed.
3. Press <Set Range> to change the range. The [Password] window appears.
4. Enter the 4-digit password.
5. Press <Enter>. When the correct password is entered, the [Set Range] screen is displayed.
6. Press <Test> to select a test parameter.
7. Enter the range values. Press "<" or ">" to move through the different fields.
8. Press <Enter> after each value is entered.
9. Repeat steps 6-8 if the ranges of other test parameters need to be changed.
10. Press <PgUp> to return to the [Range Table] screen.



- *The screen allows for eight ranges to be set for each parameter. However, not all of the ranges are used by the default settings.*
- *If ranges are changed for conventional concentration units, these changes are not transferred to the SI concentration units memory, and vice versa. To be consistent, corresponding changes must be made in both range tables. (See Table F-1 on page F-5.)*

► Using arbitrary units

If arbitrary units (1+, 2+, 3+) should be used instead of concentration values or in addition to concentration values, proceed as follows:

1. Call up the [Set Range] screen.
2. Press <Test> to select a test parameter.
3. Enter the arbitrary unit in the corresponding field and delete the concentration value by pressing <Space> if you want to replace the conventional or SI units.
4. Enter the arbitrary unit in the corresponding field without deleting the concentration value if you want to used combined units, for example, "2+ 25".



If combined units are used for the parameter Glucose, the entry of "4+1000" is not possible because of the limitation of 5 digits per field. Use "4+999" instead.

► To change the reflectance values

1. Press <Set Reflect>. on the [Range Table] screen. The [Password] window appears.
2. Enter the 4-digit password.
3. Press <Enter>. When the correct password is entered, the [Set Reflectance] screen is displayed.
4. Press <Test> to select a test parameter.
5. Enter the new reflectance values between the indicated values. Apply moderate changes and validate the effect to the evaluation sensitivity.
6. Press <Enter> after each value is entered.
7. Repeat steps 4-6 if reflectance values of other test parameters need to be changed.
8. Press <PgUp> to return to the [Range Table] screen.



- *The screen allows for eight values to be set for each parameter. However, not all of the values are used by the default settings.*
- *Reflectance values that have been changed will be marked with a "#" flag on the [Range table] screen as well as in the Parameter Settings printout. This flag will also appear with the corresponding test parameter on the result printout.*

► To set default concentration ranges and reflectance values

1. Press <Default> on the [Range Table] screen. The [Password] window appears.
2. Enter the 4-digit password.
3. Press <Enter>. When the correct password is entered, the [Default] window appears to confirm the change to the default settings.
4. Press <OK> to confirm. The changed concentration ranges and reflectance values are set to default.
5. Press <PgUp> to return to the [Test Parameters] screen.

Units

► To select the concentration units

The operator can select the units for reporting results (conventional or SI).

1 Press <Units> on the [Test Parameters] screen. The [Units] screen is displayed. The units currently in use are displayed.

2 Press <Units> to change the type of units to be displayed on the screen and on the printouts, and to be sent to the host computer. The [Confirmation] window appears.

3 Press <OK> to change units.



When the units are changed, results are reported in the newly chosen units. Therefore, it is important to set units before starting measurements. The change of units also applies when re-printing previously measured results.

System parameters

The operator can select six system parameter settings. They are:

- Sample barcode
- Printer (includes the paper length, the number of samples printed per page, and the page heading)
- Communication
- Date and time
- Password
- Registration of the wash rack

► To set system parameters

1 Press <System Parameters> on the [Parameters] screen. The [System Parameters] screen is displayed.

Sample barcode

► To select the type of barcode

1 Press <Sample Barcode> on the [System Parameters] screen. The [Sample Barcode] screen is displayed.

2 Press <Sample Barcode> to enable or disable the use of a barcode.



If sample barcode is enabled, any sample with no barcode label or an unreadable barcode, results in an alarm message. In this case, samples are still tested. If sample barcode is disabled, no sample barcodes are read.

3 Press <Code39 C/D>, <NW7 C/D>, and <ITF C/D> to enable or disable the use of a check digit function for each type of barcode. A [Warning] window will alert the operator of the increased probability for misreads when check digits are disabled.

4 Press <PgUp> to return to the [System Parameters] screen.



If using an ITF barcode type, Roche/Hitachi recommends its use only with a check digit function.

Printer

► To define printer settings

1 Press <Printer> on the [System Parameters] screen. The [Printer] screen is displayed.

2 Press <Paper Length> to define the paper size.

3 Press <Samples/Page> to define the number of samples to be printed per page.

4 Press <Headline edit>. The [Headline edit] screen is displayed.

5 Enter the new headline (up to 26 characters per line).

6 Press <Enter> at the end of each line.

7 Press <PgUp> twice to return to the [System Parameters] screen.

COMM. parameter

► To define the communication parameters



Changing the settings is only possible when the analyzer is set to "Host Off-line" (see "Start conditions before sampling" on page C-5).

1 Press <COMM. Parameter> on the [System Parameters] screen. The [COMM. Parameter] screen is displayed.

2 Press <Baud Rate>, <Parity>, <Bits Per Char.>, and <Stop Bit> to select the settings for communicating with the host computer.



These settings must match the corresponding settings of the host computer. Only specialists or trained supervisors should change these settings.

3 Press <PgUp> to return to the [System Parameters] screen.

Date/Time

The operator can change the format of the date and time, and set the correct local dates, which are displayed on the touch screen and reported with the measurement results and in the alarm messages.

► To select format and local settings for date and time

1 Press <Date/Time> on the [System Parameters] screen. The [Date/Time] screen is displayed.

2 Press <Order> to change the format of the date.

3 Press <Time> to change the format of the time from 12 hour to 24 hour.

4 Enter the correct local date and time.

5 Press <Enter> after each entry.

6 Press <PgUp> to return to the [System Parameters] screen.

Password

The operator can change the password used to gain access to the [Sieve & Abnormal Setting], [Set Range], [Set Reflectance], and [Default] screens. The password is identical in each case. Only numerical characters can be used.

► To change the password

1. Press <Password> on the [System Parameters] screen. The [Password] window appears.
2. Enter the old (current) 4-digit password.
3. Enter the new 4-digit password.
4. Re-enter the new password.
5. Press <Enter> after each entry.
6. Press <PgUp> to return to the [System Parameters] screen.

Register the wash rack

The operator can define the ID of the rack to be used for washing. If the washing procedure is performed using a rack on the rack input line, the analyzer recognizes the specified rack and performs the washing procedure.

► To register the wash rack

1. Press <Regist. Wash Rack> on the [System Parameters] screen. The [Regist.Wash Rack] screen is displayed.
2. Enter the consecutive range of the wash rack ID numbers in the fields provided. The wash rack ID numbers must consist of five digits, and overlapping ranges (for example, with routine sample racks) are not allowed.



If the 5 digit number of the chosen rack is not known, read and print the rack ID via the Barcode Check function (see "Checks" on page C-41).

3. Press <Enter> after each entry.
4. Press <PgUp> to return to the [System Parameters] screen.



Mark the specified rack as a wash rack. Do not use the wash rack for routine or control samples; otherwise, the samples will not be measured.

Parameter media

The operator can select three media functions. They are to Load, Save, and Print the parameter settings.

► To select the functions

1 Press <Parameter Media> on the [Parameters] screen. The [Parameter Media] screen is displayed.

Load

► To load the parameter settings

1 Insert the backup diskette with the parameter settings.

2 Press <Load Parameters> on the [Parameter Media] screen. The [Load Parameters] window appears.

3 Select <Test> or <System>.

4 Press <OK> to confirm loading of the parameters from the diskette to the analyzer.

Save

► To save parameter settings to a diskette

1 Insert a 1.44 MB diskette.

2 Press <Save Parameters> on the [Parameter Media] screen. The [Save Parameters] window appears.

3 Press <OK> to confirm downloading of the parameters to a diskette from the analyzer.

For further diskette options, see:

👁 *"FD utilities" on page C-43*

Print

► To print the parameter settings

1 Press <Print Parameters> on the [Parameter Media] screen. The [Print Parameters] window appears.

2 Press <OK> to confirm the printing of the parameters. All parameter settings (test parameters and system parameters) are printed.

Cassette

This chapter describes installation and handling of the URISYS 2400 cassette.

In this chapter *Chapter* **4**

First-time installation 30
Unpack and install the cassette 30

First-time installation

Unpack and install the cassette

The cassette is delivered in an airtight polyethylene-coated aluminum bag, which is tightly placed in an outer package box. This secure packaging ensures the shelf life of the cassette in the unopened package as printed on the package box.



When the aluminum bag is opened, the cassette must be placed into the cassette compartment of the instrument and the compartment door firmly closed within three minutes to prevent damage of the test strips by humidity or nitrous gases in the air.

The test strips are stable within the tightly closed cassette compartment for fourteen days. After this time, the cassette must be replaced by a new one.

Carefully unpack the URISYS 2400 cassette to prevent damage to the test strips. Use the [Change Cassette] screen in the Maintenance menu to install the cassette for the first time. The instrument must be in Standby.

► To unpack and install the cassette for the first time

1. Press <Menu> on the [Routine Monitor] screen. The [Menu] screen is displayed.
2. Press <Maintenance>. The [Maintenance] screen is displayed.
3. Press <Change Cassette>. The [Change Cassette] screen is displayed.
4. Press <Remove> to set the cassette holder mechanism to the exchange position.
5. A confirmation window “Press <Execute> to start change cassette” appears.
6. Press <Execute>. A window “Do not open the door” appears, followed by “Exchange Cassette, then press <Yes> key”.
7. Open the URISYS 2400 package, unfold the aluminum bag and cut it open with scissors.
8. Remove the cassette from the packaging as shown below and remove the two protection pads.



Figure B-12 URISYS 2400 cassette with protective covers

9 Open the cassette compartment door on the analyzer.

10 Place the cassette on the opened door and move it smoothly into the cassette compartment with the label facing out.

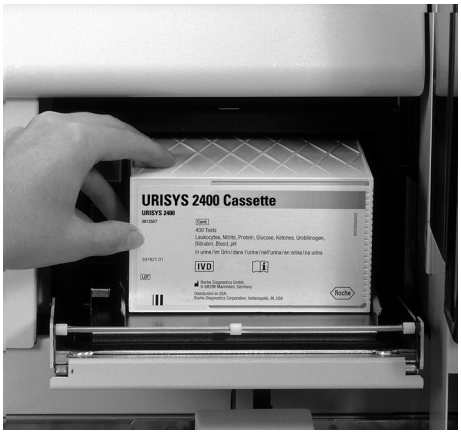

Figure B-13 Inserting cassette into URISYS 2400 analyzer

11 Move the cassette completely to the rear of the cassette compartment, ensure it fits correctly, and close the door firmly.

12 Press <Yes> on the window screen for confirmation to return to the [Change Cassette] screen.

13 Enter the Lot Number of the cassette from the outer packaging box. Press <Enter> to confirm.

14 Enter for “Alarm level” the number of remaining strips that will lead to an alarm message indicating a low number of strips (default setting is 40).

15 Press <New> to set the cassette mechanism to the working position. A window “Do not open the door” appears.

16 After completing the setting, a confirmation window “Initialization complete, press <OK> to continue” appears.

17 Press <OK> to return to the [Change Cassette] screen.

18 Press <Home> to return to the [Routine Monitor] screen. The screen shows the number of remaining strips as 400, followed by the date the cassette was installed.



When a cassette becomes empty during sample processing, replacement by a new cassette can be performed through the [Routine Monitor] screen by activating the <Change Cassette> button, (see "Replace an empty URISYS 2400 cassette" on page C-18).

Handling precautions

When handling test strips, the following precautions must be observed:

- Only use a URISYS 2400 cassette that has not exceeded its expiration date.
- Store cassette packages at a temperature between 2-30°C (36-86°F).
- Refrigerated cassettes must be at room temperature for at least two hours before opening the package and using the cassette.
- Check the package for damage.
- After removing the cassette from the packaging, ensure the test strip layers are correctly aligned and the test pads are not unusually discolored.
- Do not directly touch the test pads of the test strip.
- Do not let the strips come in contact with water or with any volatile, strongly acidic, or alkaline chemicals.
- Install the cassette into the analyzer within 3 minutes of opening the seal.
- Keep the cassette in the firmly locked cassette compartment until the test strips are completely used up.
- Do not open the cassette compartment door as long as the cassette is not empty or the on-board stability has not expired.
- Follow the instructions provided with the URISYS 2400 cassette by the manufacturer and read carefully all information on the package insert.

Operation C

Part C contains the operating procedures for the URISYS 2400.

Daily operation

This chapter describes daily operation for the URISYS 2400.

In this chapter *Chapter* **5**

Initial preparations 3
System start 4
Start conditions before sampling 5
Sample preparation 8
Preparation of sample racks and tubes 8
Loading the rack(s) onto the analyzer 9
Start analysis of samples 10
Termination of analysis 11
Completion of analysis 11
Interrupting analysis 11
Automatic termination 12
Termination due to an alarm 12
Remove processed samples 12
Process additional samples 13
Process STAT (emergency) samples 14
During routine sampling 14
After interruption or completion of routine sampling 16
Start from Stand-By status 16
Process control samples 17
Replace an empty URISYS 2400 cassette 18
Replace an expired URISYS 2400 cassette 19
Re-insert a used URISYS 2400 cassette 20

Analysis and documentation of results 21
Data of routine and STAT samples 21
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Search sample data 22
Entering the sample ID number 23
Edit result data 24
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Presentation of results on the printout 25
Send result data to the host computer 26
Write/read routine or STAT sample data to/from a diskette 26
Delete routine or STAT sample data 27
Control sample data 28
Display control sample data 28
Search for control sample data 29
Print control sample data 30
Presentation of result data on the printout 30
Send control sample data to the host computer 32
Write/read control sample data to/from a diskette 32
Delete control sample data 33
Switch off the analyzer 34

Initial preparations

Before switching on the power to operate the analyzer, perform the following tasks:

- Fill the water supply tank with deionized water and place the liquid level detector in the water supply tank.
- Ensure that the TS transfer base is inserted correctly.
- Empty the strip waste container and ensure that it is positioned correctly.
- Empty the liquid waste tank.
- Place an empty rack tray on the rack output line.
- Remove all air bubbles from the syringes after switching on the analyzer.

"Air purge" on page D-7

System start

► To start the URISYS 2400 analyzer

The power switch is located on the right side of the analyzer. The OFF position is represented by O.

1 Turn the power switch to the ON (|) position. The [Please Wait] screen appears. Loading and initializing of the software takes approximately 5 minutes. After the first loading stage, the progress is indicated on-screen.

2 Check and remedy any alarm messages. Clear the alarm messages.

"Instrument alarms (messages)" on page E-12

3 Press <Home> on the [Copyright] screen. The [Routine Monitor] screen is displayed.

4 Wait until the analyzer is in Stand-By status before continuing.

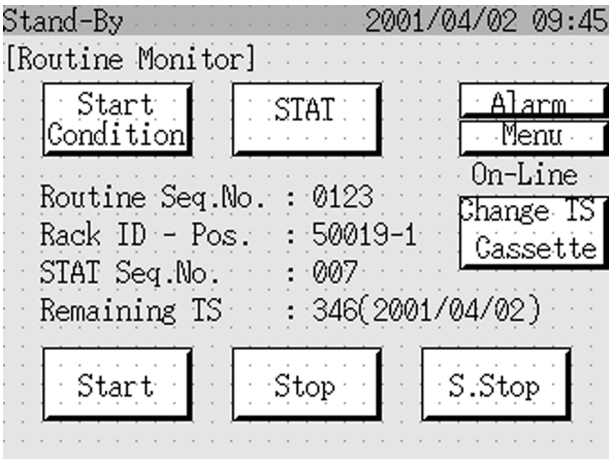

Figure C-1 Routine Monitor screen

Start conditions before sampling

After powering on the analyzer, the operating conditions must be specified and checked. These include the following:

- Specify the sample details.
- Specify the operator ID.
- Activate or deactivate the host connection as required.
- Select the print mode.

► To confirm the start conditions

For input of numbers or change of the host and printer settings, the analyzer must be in Stand-By.

1 Press <Start Condition> on the [Routine Monitor] screen. The [Start Condition] screen is displayed.

2 Confirm that the details on the [Start Condition] screen are correct.

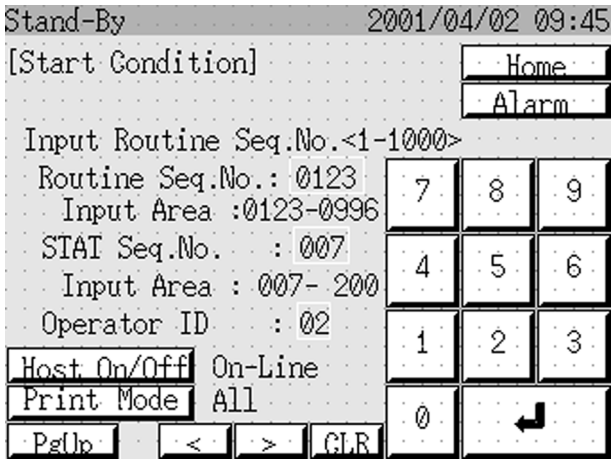

Figure C-2 Start Condition screen

► To enter the routine sequence number, STAT sequence number and operator ID

1. Ensure the [Start Condition] screen is displayed.
2. Enter a starting routine sequence number (Routine Seq. No.) to start a series of measurements with a number different from the displayed routine sequence number. Four-digit numbers are accepted by the analyzer in the indicated "Input Area" number range only.
3. Press <Enter>.
4. Enter a starting STAT sequence number (STAT Seq. No.) to give the next STAT sample a number different from the displayed STAT sequence number. Three-digit numbers are accepted by the analyzer in the indicated "Input Area" number range only.
5. Press <Enter>.
6. Enter an operator ID between 1 and 99.
7. Press <Enter>.
8. Press <PgUp> to return to the [Routine Monitor] screen.



The "Input Area" indicates the sequence number range that follows the displayed sequence number and is not yet occupied by sample results. The range end number is the number of the next occupied sequence number minus five.

An example of the numbering ranges would be as follows:

122 samples have been measured starting with Seq. No. 0001. The displayed Routine Seq. No. is 0123. No samples with higher sequence numbers have been measured. In this case, an input range of 0123-0996 is displayed.

For example, the next occupied (measured) sequence number is 0001. Due to the ring buffer structure of the result memory, this is equivalent to 1001. The end of the input range is calculated as 1001 - 5 = 996. Input of 996 allows the measurement of one additional rack with 5 samples before reaching the next occupied sequence number. For alarm messages when reaching the next occupied sequence number, see:

"Start analysis of samples" on page C-10



When using the "Overwrite Mode", be aware that the sequence number will swap to 1 automatically after the sequence counter has reached 1000 (or 200 for STAT). In this case, the instrument starts to overwrite results with sequence numbers starting at 1 again.



If the "Input Area" is indicated as 0000 - 0000, delete the results of samples with sequence numbers higher than the displayed Seq. No., (see "Delete routine or STAT sample data" on page C-27). Otherwise, analysis of samples cannot continue.

► To activate/deactivate the connection to the host computer

Using the [Start Condition] screen, the operator can choose to activate or deactivate the connection to a host computer system. Ensure that the analyzer and the host computer are connected via an interface cable.

1 Press <Start Condition> on the [Routine Monitor] screen. The [Start Condition] screen is displayed.

2 Press <Host On/Off> to activate or deactivate the connection.

3 Press <PgUp> to return to the [Routine Monitor] screen.

► To select real time printouts and specify the result data to be printed

Using the [Start Condition] screen, the operator can select to have the result data printed in real time. In this case, the result is printed as soon as the measurement of a sample is completed. The categories of results to be printed can also be selected.

The options are:

- All
- Abnormal
- Sieve
- Normal
- None

1 Press <Start Condition> on the [Routine Monitor] screen. The [Start Condition] window is displayed.

2 Press <Print Mode> to select the category of results to be printed.

3 Press <PgUp> to return to the [Routine Monitor] screen.



- *When "None" is selected, no result data are printed in real time.*
- *For batch-wise printing or reprinting result data, see "Print routine and STAT sample data" on page C-24.*

Sample preparation



The analyzer processes urine (including control urine) samples.
Wear protective gloves when preparing samples and placing samples onto the analyzer.
If the sample contacts the operator's skin, wash the affected area immediately with a large volume of water.



Analyze samples within two hours from the time that the urine samples were obtained.
Do not expose samples to direct sunlight.
Do not add any preservatives to the samples.
Take care that sample material does not contain air bubbles or foam.

Preparation of sample racks and tubes

When preparing the samples for processing, use only Roche Diagnostics 5-position standard racks and recommended sample tubes with the URISYS 2400 analyzer.

Different types of sample tubes can be used, but they must have the following dimensions:

- 13-16 mm diameter
- 100-115 mm height

The types of sample tubes recommended for use with the analyzer include:

- Round-bottomed tubes
- Conical tubes
- KOVA tubes (Hycor Biomedical Inc.)
- Urine Monovette (Sarstedt)



If using KOVA-tubes, sample racks need to be equipped with "KOVA-spacers".



If samples arrive in different containers, transfer them to recommended test tubes. Use a minimum sample volume of 1.5 ml for round-bottomed tubes, and 2 ml for conical, KOVA, and Monovette tubes.

If a syringe sample tube is used, for example Urine Monovette, ensure that the plunger is at its lowest position. Otherwise, the sample probe may be damaged.

If the sample tubes are labeled with barcodes, ensure that the barcode labels are correctly aligned with the barcode reader. For more information about the specifications of usable barcodes and the placement of labels on sample tubes, see:

"Barcode specifications" on page F-3

Loading the rack(s) onto the analyzer

It is possible to set a maximum of 15 racks on the input line at one time. There are two ways of loading the racks onto the analyzer:

- Use a rack tray.
- Load directly onto the input line, without a rack tray.

Do not set the racks directly on the cross-feed line.

► To load racks using a rack tray

1. Place the sample tubes in the racks.
2. Place the racks on a rack tray (maximum 15 racks).
3. Hook the rack tray into the notches in front of the rack input line.
4. Move the racks smoothly from the tray onto the rack input line.



Figure C-3 Loading racks onto URISYS 2400 analyzer with the rack tray

5 Ensure that the rack tray is aligned horizontally with the rack input line. Move the racks with care in order not to spill the samples.



Figure C-4 Loading a rack directly into the guide rail of the rack input line

A *Rack*
B *Sample tube*
C *Guide rail*
D *Rack input line*

► To load racks directly onto the rack input line, without a rack tray

1 Place the sample tubes in the racks.

2 Place the racks directly into the guide rail of the rack input line.

Start analysis of samples

Before starting analysis, check that the 14 days on-board stability of the cassette has not expired. The loading date of the cassette is displayed on the [Routine Monitor] screen in the line “Remaining TS”.

👁 *Figure C-1 on page C-4*

Press <Start> on the [Routine Monitor] screen, to start the analysis of samples.

The status of the analyzer changes from Stand-By to Reset. The analyzer performs a reset (clearing racks from the cross-feed line, resetting the pipetting system, clearing test strips from the TS transfer base) and then starts sampling and measurement of samples, indicated by change of the status to Operation.

During analysis, the sequence number on the [Routine Monitor] screen increases by one for each routine or STAT sample. At the same time, the rack and position number of the pipetted sample is displayed, and the number of remaining strips decreases by one with each processed test strip.

If the sample sequence number comes close to sequence numbers that have already been measured and are stored in the result memory, an alarm message

appears (“Warning/Data overwrite”). The analyzer changes to S.Stop or Stand-By status.

“To enter the routine sequence number, STAT sequence number and operator ID” on page C-6

Delete the results of samples with sequence numbers higher than the actual sequence number.

“Delete routine or STAT sample data” on page C-27

Otherwise, analysis of samples cannot continue.



Do not open the cassette compartment door or the strip waste container door during analysis. Otherwise, the analyzer stops and moves to Stand-By status. When <Start> is pressed again, the subsequent reset clears the racks still present in the cross-feed line without sampling them, and removes test strips still present on the TS transfer base without measuring them.

Termination of analysis

Completion of analysis

After measuring the last test strip, the analyzer changes to Stand-By.

To continue sampling, place more racks with sample tubes on the input line, and press <Start> to begin analysis again. The analyzer continues sampling and measurement. For more information on the processing of additional samples, see:

“Process additional samples” on page C-13

Interrupting analysis

Using the S. Stop button on the [Routine Monitor] screen, the operator can interrupt analysis. Racks in the cross-feed line are still processed; then the analyzer turns to Sampling Stop status. Racks in the input line remain in their current position. Samples that have already been pipetted onto test strips are measured.

► To interrupt analysis

1. Press <S.Stop> on the [Routine Monitor] screen. The confirmation window appears.
2. Press <OK> to stop sampling.

► **To continue analysis of samples**

1 Place the next racks directly into the rack input line.

2 Press <Start> on the [Routine Monitor] screen. The analyzer continues sampling and measurement without an intermediate reset.

► **To interrupt and restart analysis**

1 Press <Stop> on the [Routine Monitor] screen. The confirmation window appears.

2 Press <OK>. The status of the analyzer changes to Stand-By via Stop status.



When <Start> is pressed again, the subsequent reset clears the racks still present in the cross-feed line without sampling them, and removes test strips still present on the TS transfer base without measuring them.

Automatic termination

If there are no more racks on the rack input line, sampling is automatically terminated. The analyzer moves to Sampling Stop status. The processing of test strips continues until all samples that have been pipetted onto test strips have been measured.

Termination due to an alarm

Various alarms can terminate the processing of samples. For more information on alarms, see:

"Instrument alarms (messages)" on page E-12

Remove processed samples

Processed sample racks are automatically transferred to the tray on the rack output line. If the rack tray is full, an alarm occurs (Rack Full). The analyzer moves to Sampling Stop status.

► **To remove processed samples**

1 Remove the tray from the rack output line.

2 Remove the racks from the tray.

3 Place the empty tray on the rack output line.

Process additional samples

The operator can feed additional samples when the analyzer is in Operation, Sampling Stop, or Stand-By status. In Operation status, sampling proceeds automatically; in Sampling Stop and Stand-By status, the operator must press <Start> after loading the racks on the rack input line.

► To process additional samples

Operation status

1. Place the racks on the rack input line, either directly or using a rack tray.
2. When the rack end of the previous rack is detected, the rack pushers automatically return to the front of the rack input line to search for additional racks, and move them to the cross-feed line for sampling.

Sampling Stop status

1. Place the racks on the rack input line, either directly or using a rack tray.
2. Press <Start> on the [Routine Monitor] screen. The rack pushers automatically move the racks to the cross-feed line for sampling.

Stand-By status

1. Place the racks on the rack input line, either directly or using a rack tray.
2. Press <Start> on the [Routine Monitor] screen. The analyzer performs a reset; then the rack pushers automatically move the racks to the cross-feed line for sampling.

Process STAT (emergency) samples

By using the STAT position on the analyzer, the operator can give priority to a single emergency sample.

There are three statuses in which a STAT sample can be measured:

- Operation status, during routine sampling
- Sampling Stop status, after interruption or completion of routine sampling
- Starting from Stand-By status



STAT sample results are stored in a separate STAT sample memory. STAT samples are marked on the result printout with an "E" preceding the sequence number.

Sample ID and rack ID are not read in the STAT position of the analyzer. To enter a STAT sample ID manually, the barcode reader at the cross-feed line must be set to "Enable".

"System parameters" on page B-24

During routine sampling

This procedure can be performed while other samples are being processed and the analyzer is in Operation status.

The STAT sample is given priority over other samples. After measurement of the STAT sample, measurement of routine samples resumes.

► To insert a STAT sample during routine sampling

1. Place the STAT sample in position 1 of a sample rack.
2. Place the rack in the STAT position on the analyzer with position 1 facing the rear of the analyzer.

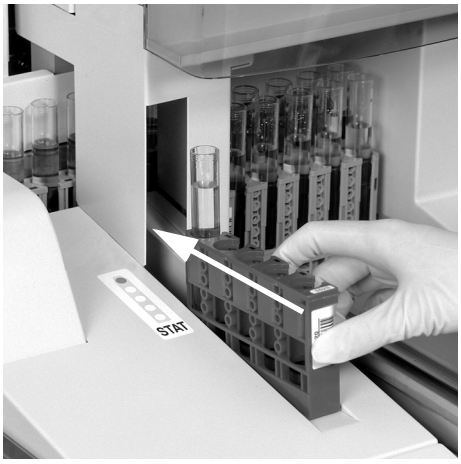

Figure C-5 Inserting a STAT sample into the analyzer

3. Press <STAT> on the [Routine Monitor] screen. The [STAT] screen is displayed.
4. Enter a STAT ID (if available, and barcode reader enabled) for the sample using alphanumerical characters.
5. Press <Enter> to confirm the entry.
6. Press <OK>.

The STAT sample is processed in the next sampling cycle. After that, processing of routine samples resumes.

Only one STAT sample can be processed at a time.

If the status of the analyzer changes to Rack End (Norm) while a STAT sample is being prepared, wait until sampling stops and the status of the analyzer changes to Sampling Stop, before proceeding.

👁 *"To process a STAT sample in Sampling Stop status" on page C-16*

After interruption or completion of routine sampling

This procedure is performed when the analyzer is in Sampling Stop status.

► To process a STAT sample in Sampling Stop status

1 Follow steps 1-6 of:

"To insert a STAT sample during routine sampling" on page C-15

2 Press <Start> on the [Routine Monitor] screen. The status of the analyzer changes to Operation.

3 The STAT sample is pipetted and measured. Then the status of the analyzer returns to Sampling Stop.

Start from Stand-By status

This procedure is performed when the analyzer is in Stand-By status and a STAT sample arrives for measurement. In this case, the analyzer must first be set to Operation status.

► To process a STAT sample in Stand-By status

1 Place the STAT sample in position 1 of a sample rack.

2 Place the rack in the STAT position on the analyzer with position 1 facing the rear of the analyzer.

3 Press <Start> on the [Routine Monitor] screen. Reset occurs automatically and the status of the analyzer changes to Operation.

4 Press <STAT>. The [STAT] screen is displayed.

5 Enter a STAT ID for the sample (if available) using alphanumerical characters.

6 Press <Enter> to confirm the entry.

7 Press <OK> while the analyzer is still in Operation status.

8 Wait until the STAT sample is pipetted and measured. The status of the analyzer changes to Sampling Stop.



If <OK> is pressed during the rack end status, the sample will not be measured. Wait until the analyzer changes to Sampling Stop, then proceed as described in "To process a STAT sample in Sampling Stop status" on page C-16.

Process control samples

Ensure that each urine control sample is placed exactly into the corresponding rack position that has been defined in the [Regist. Control Rack] screen. For more information on specifying control racks, see:

"Controls" on page B-19

Sample ID is not detected and recorded for control samples.

In order to store the control results in the control samples memory, only use the racks that have been specified as control racks for the control samples. The control rack can be placed on the rack input line when the analyzer is in Operation, Sampling Stop or Stand-By status as described in:

"Process additional samples" on page C-13

The rack is identified by the analyzer as a control rack by means of the specified rack ID and is processed like a routine sample rack. Sampling is only performed for the sample positions defined in the [Regist. Control Rack] screen.

The results of the control samples are stored in the control data memory. For more information, see:

"Control sample data" on page C-28



Do not use the control rack for routine samples, otherwise the routine sample results will be stored in the control data memory

Replace an empty URISYS 2400 cassette

When a URISYS 2400 cassette is empty, an alarm message is generated and the <Change TS Cassette> button on the [Routine Monitor] screen is enabled. The status of the analyzer changes to S.Stop (TS Empty). The analyzer finishes measuring the test strips being processed.

► To replace an empty URISYS 2400 cassette

1. Press <Change TS Cassette> on the [Routine Monitor] screen. The [TS Cassette (S.Stop)] screen appears.
2. Press <Remove>. The [Change Cassette] window appears.
3. Press <Execute>. The "Do not open the door" window message is displayed, followed by an "Exchange cassette and press <Yes> key" message.
4. Open the cassette compartment door.
5. Remove the cassette by pulling the handle on the left side of the cassette and take out the cassette.
6. Open a new URISYS 2400 package, unfold the aluminum bag and cut it open with scissors.
7. Remove the cassette from the packaging

   Figure B-12 on page B-31

   and remove the two protection covers.
8. Place the cassette on the opened door with the label facing out and move it smoothly into the cassette compartment.
9. Push the cassette completely to the rear of the compartment and close the door firmly.
10. Press <Yes> to return to the [TS Cassette (S.Stop)] screen.
11. Enter the lot number of the cassette if it is different to the previous cassette. This number is printed on the outer packaging box.
12. Press <Enter> to confirm the entry.
13. Press <Re-Start> to set the cassette mechanism to the working position. After completion of the setting, the analyzer automatically resumes Operation status and continues processing samples.



When the new cassette is inserted, the [Routine Monitor] screen indicates the number of remaining strips as "400" and the new loading date.

Replace an expired URISYS 2400 cassette

When a URISYS 2400 cassette has exceeded its 14-day on-board stability, and the cassette is not yet empty, it must be exchanged with a new one.



The analyzer must be in the Stand-By status. If it is not, press <STOP> on the [Routine Monitor] screen and wait for the Stand-By status to appear.

► To replace an expired URISYS 2400 cassette

1. Press <Menu> on the [Routine Monitor] screen. The [Menu] screen is displayed.
2. Press <Maintenance>. The [Maintenance] screen is displayed.
3. Press <Change Cassette>. The [Change Cassette] screen is displayed.
4. Press <Remove>. A confirmation window appears.
5. Press <Execute>. The cassette base rises to the removal position. A "Do not open the door" message is displayed, followed by an "Exchange cassette and press <Yes> key" message.
6. Open the cassette compartment door.
7. Remove the cassette by pulling the handle on the left side of the cassette and take out the cassette.
8. Insert a new cassette as described in:

   Step 6 to 9 of "To replace an empty URISYS 2400 cassette" on page C-18

9. Press <Yes> to return to the [Change Cassette] screen.
10. Enter the lot number of the cassette if it is different to the previous cassette. This number is printed on the outer packaging box.
11. Press <Enter> to confirm the entry.
12. Press <New>. The cassette mechanism is set to the working position.
13. When the setting is complete, press <OK> to return to the [TS Cassette] screen.
14. Press <Home> to return to the [Routine Monitor] screen.



When the new cassette is inserted, the [Routine Monitor] screen indicates the number of remaining strips as "400" and the new loading date. The analyzer is now ready for further processing.

Re-insert a used URISYS 2400 cassette

If a cassette has to be removed briefly, for example, in the case of a failure in the test strip processing mechanism, it can be re-used if the cassette is exposed to the open air for less than three minutes.

► To re-insert a cassette after short-term removal

1 Remove the cassette as described in:

👁 *Step 1 to 7 of "To replace an expired URISYS 2400 cassette" on page C-19"*

2 Check if all remaining test strip layers in the cassette are correctly aligned. If necessary, remove loose strips from the cassette.

3 Remove loose strips from the cassette compartment, if present.

4 Re-insert the cassette and close the compartment door firmly.

5 Press <Used> in the [Change Cassette] screen. A window "Now searching next TS" appears.

6 After completion, press <OK> to return to the [Change Cassette] screen.

7 Press <Home> to return to the [Routine Monitor] screen. The display shows the number of remaining test strips and the date of the first-time loading of this cassette.



The analyzer is now ready to continue analysis. If the failure occurs again, contact technical support.

Analysis and documentation of results

Using the <Data Monitor> menu, the operator can perform the following tasks for routine, STAT, and control samples:

- Display the result data
- Search result data
- Enter sample ID number
- Edit the result data
- Print the result data
- Send the result data to the host computer
- Write/read the result data to/from a diskette
- Delete the result data

The result data can be displayed at any analyzer status – Operation, Sampling Stop, or Stand-By. However, for documenting result data, the analyzer must be in Stand-By status.

The following sections have been divided into two parts:

- Data of routine and STAT samples
- Data of control samples

Data of routine and STAT samples

The analyzer has a memory capacity of 1000 routine sample results and a separate memory for 200 STAT sample results. The results of all test parameters for a selected sequence number or sample ID number are displayed on the screen.



If no results are available for a processed sequence number, a message, such as "Sample empty", is displayed on the screen and printed on the printout.

Display the result data

The operator can access result data in the same way for all sample types.

► To display the result data

1. Press <Menu> on the [Routine Monitor] screen. The [Menu] screen is displayed.
2. Press <Data Monitor>. The [Data Monitor] screen is displayed.
3. Press <Routine Data Monitor>. The [Routine Data Monitor] screen is displayed.

Figure C-6 on page C-22

The result of the most recently tested routine sample is displayed.

4. Press <Prev> to display the results of previously tested samples.
5. Press <Type> to toggle between the most recent routine and STAT sample result.

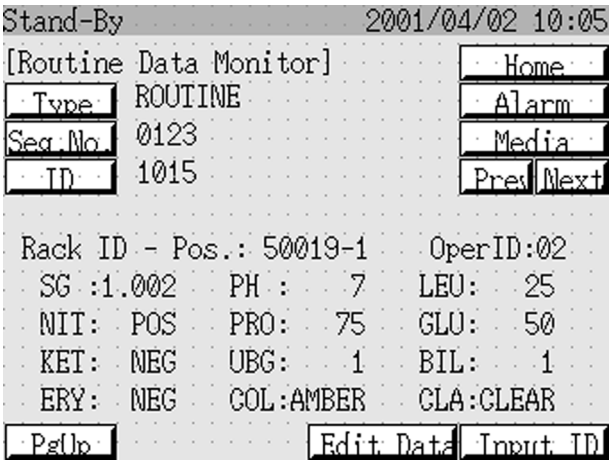

Figure C-6 Routine Data Monitor screen

Search sample data

Use the sequence number (Seq. No.) or the sample ID number (ID) to search for data for routine and STAT samples. The result data can be searched at any analyzer status – Operation, Sampling Stop, or Stand-By.

Results cannot be retrieved using rack number, position number, date and time, or operator ID.

► To search for routine and STAT sample data using the sequence number

1. Press <Type> in the [Routine Data Monitor] screen to select the type of data to be displayed (routine or STAT).
2. Press <Seq.No.> to enter the requested sequence number. The [Search Seq.No.] window appears.
3. Enter the sequence number.
4. Press <Enter>. The result data for the requested sample are displayed.
5. Press <Prev> or <Next> on the [Routine Data Monitor] screen, to display prior or subsequent results.

► To search for routine and STAT sample data using the sample ID number

1. Press <Type> on the [Routine Data Monitor] screen to select the type of data to be displayed.
2. Press <ID>. The [Search ID] window appears.
3. Enter the requested sample ID number, using alphanumeric characters.
4. Press <Enter>. The result data of the requested samples are displayed.
5. Press <Prev> or <Next> on the [Routine Data Monitor] screen, to display prior or subsequent results of the same sample ID.

Entering the sample ID number

If a sample ID number has not been read by the barcode reader, or if the sample ID must be added after measurement (for example, a STAT sample), the analyzer must be in Stand-By status and the barcode reader must be set to "*Enabled*".



Entering the sample ID number is only possible if no ID number is already stored for this sequence number.

► To enter the sample ID number

1. Press <Type> in the [Routine Data Monitor] screen to select the type of data to be displayed (routine or STAT).
2. Press <Input ID> to enter the sample ID number. The [Input ID] screen is displayed.
3. Enter the sample ID number using alphanumeric characters.
4. Press <Enter> to confirm the entry.
5. Press <OK>. A confirmation window appears.
6. Press <Yes> to return to the [Routine Data Monitor] screen.

Edit result data

► To edit routine and STAT sample data

1. Search for the requested sample by using the sequence or ID number, or the <Prev>/<Next> buttons.
2. Press <Edit Data>. The [Edit Data] screen is displayed.
3. Press "<" or ">" to select the test parameter to be edited.
4. Press "+" or "-" to increase or decrease the result.
5. Press <Save> when editing is completed. The [Confirmation] window appears.
6. Press <Yes> to return to the [Edit Data] screen. Check if the changes are correct.
7. Press <PgUp> to return to the [Routine Data Monitor] screen.



- *To edit sample data, the analyzer must be in Stand-By status*
- *Data cannot be edited if a sample is short or empty, or if a test strip error occurred, (see Table E-1 on page E-2 and "Instrument alarms (messages)" on page E-12).*

When result data are edited, they are printed with an "!" edit mark.

Print routine and STAT sample data

This print option is available for batch printing. For more information on printing in real time, see:

"To select real time printouts and specify the result data to be printed" on page C-7

► To print routine and STAT sample data

1. Press <Type> on the [Routine Data Monitor] screen to select the type of data to be displayed (routine or STAT).
2. Press <Media>. The [Routine Data Monitor Media] screen is displayed.
3. Enter the range of sequence numbers to be printed, using numbers between 1 and 1000 for routine sample data, or between 1 and 200 for STAT sample data. Enter 0 to print all sample data.
4. Press <Print>. The [Confirmation] window appears.
5. Press <Data Select> to select the category of results to be printed (All, Abnormal, Sieve, Normal).
6. Press <OK> to start printing.

7 Press <Stop> to terminate printing at any time.

To print sample data, the analyzer must be in Stand-By status.

Presentation of results on the printout

The operator can specify the print order of the test parameters on the printout, and the number of samples to be printed on each page.

"Print order" on page B-18

"To set the print order" on page B-19

The printout includes the following:

- Headline
- Date and time of the printout
- The sequence number of the sample (with a leading N for routine samples or E for STAT samples)
- Rack number and the position of the sample in the rack
- Sample ID (whether read by the barcode reader or entered by the operator)
- Operator ID
- Date and time of measurement
- Test parameter results
- Flags

Table E-1 on page E-2

```
Urisys 2400 Analytical Report                          2001.04.02  09:59
 S.No.N0123 RACK 50019-1     ID    1015          OP2  2001.04.02    09:58
   SG   1.002                PH       7                * LEU     25  /µL       S
*  NIT  POS         S      * PRO      75  mg/dL   S    * GLU     50  mg/dL
   KET  NEG                * UBG       1  mg/dL        * BIL      1  mg/dL
   ERY  NEG                  COL   AMBER                  CLA   CLEAR


 S.No.E007                   ID                   OP2  2001.04.02    10:22
   SG   1.002                PH       7                * LEU     25  /µL       S
*  NIT  POS         S      * PRO     150  mg/dL   S      GLU   NORM
   KET  NEG                  UBG    NORM                 BIL    NEG
   ERY  NEG                  COL   AMBER                  CLA   CLEAR
```

Figure C-7 Example of routine sample and STAT sample printouts

Send result data to the host computer

This option is available for batch sending.

To send data, the host connection must be activated.

👁 *"To define the communication parameters" on page B-26*

👁 *"To activate/deactivate the connection to the host computer" on page C-7*

► To send routine or STAT sample data to the host computer

1. Press <Type> on the [Routine Data Monitor] screen to select the type of sample data to be sent (routine or STAT).
2. Press <Media>. The [Routine Data Monitor Media] screen is displayed.
3. Enter the range of sequence numbers to be sent, using numbers between 1 and 1000 for routine sample data, or between 1 and 200 for STAT sample data. Enter 0 to send all sample data.
4. Press <Send>. The [Confirmation] window appears.
5. Press <OK>.
6. Press <Quit> to terminate the transfer of data at any time.



To send sample data, the analyzer must be in Stand-By status.

Write/read routine or STAT sample data to/ from a diskette

This option allows for data to be saved on a diskette or for data to be read from a diskette.

► To write/read routine or STAT data to/from a diskette

1. Press <Type> on the [Routine Data Monitor] screen to select the type of sample data to be written/read (routine or STAT).
2. Press <Media>. The [Routine Data Monitor Media] screen is displayed.
3. Enter the range of sequence numbers to be written/read to/from a diskette, using numbers between 1 and 1000 for routine sample data, or between 1 and 200 for STAT sample data. Enter 0 to write/read all sample data.
4. Press <FD R/W>. The [Confirmation] window appears.
5. Press <File Type> to select the format of the files to be written/read (ASCII or binary).
6. Insert appropriate diskette.

7 Press <Write> to write data to a diskette, or press Read to read data from a diskette.

If result data are read from a diskette, the data actually stored in the analyzer are deleted before the data on diskette are read.

The option to read from a diskette is only available in binary format.

Delete routine or STAT sample data

Sample data can be cleared from the memory either completely or selectively, within a range of sequence numbers.

► To delete routine or STAT sample data

1 Press <Type> on the [Routine Data Monitor] screen to select the type of sample data to be deleted (routine or STAT).

2 Press <Media>. The [Routine Data Monitor Media] screen is displayed.

3 Enter the range of sequence numbers to be deleted using numbers between 1 and 1000 for routine sample data, or between 1 and 200 for STAT sample data. Enter 0 to delete all sample data.

4 Press <Delete>. The [Confirmation] window appears.

5 Press <OK>.

To delete sample data, the analyzer must be in Stand-By status

On deletion, the sample data of the selected sequence numbers are permanently removed from the analyzer memory.

It is recommended to clear the analyzer memory daily after reviewing and documentation of the data.

Control sample data

The analyzer has a memory capacity of 100 samples for each of the specified control rack positions. The results of all test parameters for a selected sequence number are displayed on the screen.

If no results are available for a sample, a message, for example "Sample short" is displayed on the screen and printed on the printout.

Display control sample data

► **To display control sample data**

The operator can access result data in the same way for all control samples.

1. Press <Menu> on the [Routine Monitor] screen. The [Menu] screen is displayed.
2. Press <Data Monitor>. The [Data Monitor] screen is displayed.
3. Press <Control Data Monitor>. The [Control Data Monitor] screen is displayed. The concentration results of the most recently tested control sample are displayed.

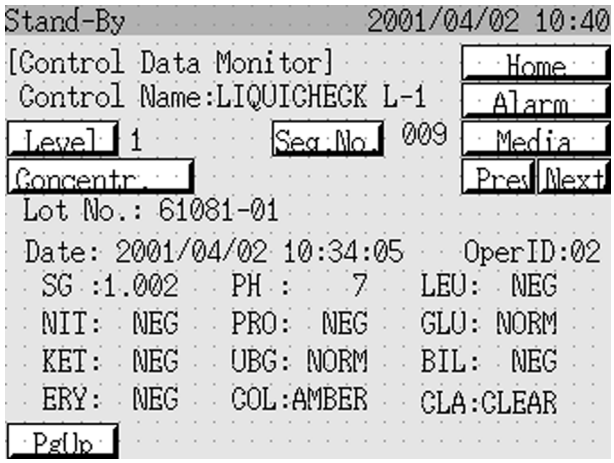

Figure C-8 Control Data Monitor screen (concentration results)

4. Press <Prev> to display the results of previously measured control samples.
5. Press <Level> to display the results of another level.

6 Press <Concentr.> to change to the display of the results as reflectance values of the same control sample, or <Reflectance> to return to the concentration values.

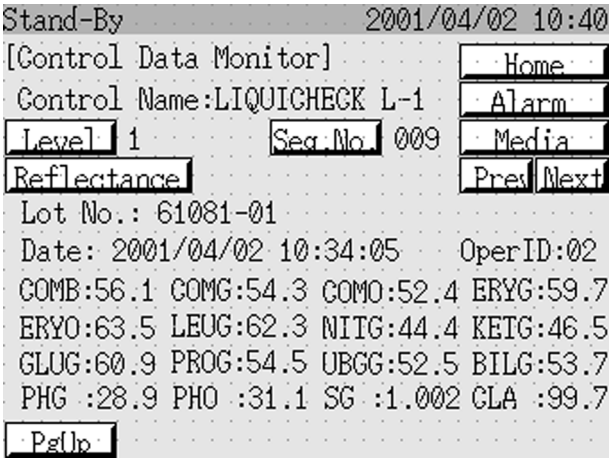

Figure C-9 Control Data Monitor screen (reflectance values)

Search for control sample data

Use the sequence number and the level category of the controls to search for data of control samples.

Results cannot be retrieved using the control name, lot number, date and time, or operator ID.

► To search for control sample data using the sequence number

1 Press <Level> on the [Control Data Monitor] screen to select the level of controls to be displayed.

2 Press <Seq. No.> to enter the requested sequence number.

3 The [Control Seq. No.] window appears.

4 Enter the sequence number, using numbers between 1 and 100.

5 Press <Enter>. The result data of the entered sequence number are displayed.

6 Press <Prev> or <Next> to display previous or subsequent control samples data.

7 Press <Concentr.> or <Reflectance> to select concentration data or reflectance data.

Print control sample data

This option allows for batch printing of control sample data of the selected level.

► To print control sample data

1. Press <Level> on the [Control Data Monitor] screen to select the level of controls.
2. Select <Concentration> or <Reflectance>.
3. Press <Media>. The [Control Data Monitor Media] screen is displayed.
4. Enter the range of sequence numbers to be printed between 1 and 100. Enter 0 to print all data.
5. Press <Print>. The [Confirmation] window appears.
6. Press <OK>.
7. Press <Stop> to terminate printing at any time.



To print control sample data, the analyzer must be in Stand-By status.

Presentation of result data on the printout

The print order of the test parameters results in concentration values is identical to the order selected for routine samples.

👁 *"Print order" on page B-18*

The printout includes the following:

- Headline
- Date and time of the printout
- The sequence number of the sample (with a leading C1 for control samples in position 1 of the rack, C2 for position 2 and C3 for position 3)
- Rack number and the position of the sample in the rack
- Operator ID
- Date and time of measurement
- Control name
- Control lot number
- Lot number and loading date and time for the URISYS 2400 cassette
- Test parameter results
- Flags

👁 *Table E-1 on page E-2*

```
URISYS 2400 ANALYTICAL REPORT                                2001.04.02 10:36

   S.No.C1009 RACK 30001-1                                OP2   2001.04.02 10:34
   CONTROL NAME                                      LIQUICHECK L-1
   CONTROL LOT No.                                        6108101
   T/S CASSETTE LOT No.                              28782701
   T/S CASSETTE ON-BOARD DATE/TIME                   2001.04.02 10:28

   SG      1.002                PH       7                    LEU   NEG
   NIT     NEG                  PRO  NEG                      GLU   NORM
   KET     NEG                  UBG  NORM                     BIL   NEG
   ERY     NEG                  COL  AMBER                    CLA   CLEAR


   S.No.C1009 RACK 30001-1                                OP2   2001.04.02 10:34
   CONTROL NAME                                      LIQUICHECK L-1
   CONTROL LOT No.                                      6108101
   T/S CASSETTE LOT No.                              28782701
   T/S CASSETTE ON-BOARD DATE/TIME                   2001.04.02 10:28

   COM-B   56.1      COM-G  54.3       COM-O   52.4     ERY-G  59.7
   ERY-O   63.5      LEU-G  62.3       NIT-G   44.4     KET-G  46.5
   GLU-G   60.9      PRO-G  54.5       UBG-G   52.5     BIL-G  53.7
   PH -G   28.9      PH -O  31.1       SG     1.002     CLA    99.7
```

Figure C-10 Printout of control samples

If “Reflectance” has been selected, reflectance values for each measured position of the test strip with an indication of the wavelength used (B = blue 470 nm, G = green 555 nm, O = orange 620 nm) are printed. The SG value is the result value; the clarity (CLA) value is the percent value of light transmission. The print order of reflectance values is fixed and cannot be changed.

Send control sample data to the host computer

This option is available for batch sending. The host connection must be activated.

👁 *"To activate/deactivate the connection to the host computer" on page C-7*

Sample data are transferred only for the control level selected.

► To send control sample data to the host computer

1. Press <Level> on the [Control Data Monitor] screen to select the level of controls.
2. Select <Concentr.> or <Reflectance>.
3. Press <Media>. The [Control Data Monitor Media] screen is displayed.
4. Enter the range of sequence numbers between 1 and 100 to be sent to the host computer. Enter 0 to send all data to the host computer.
5. Press <Send>. The [Confirmation] window appears.
6. Press <OK>.
7. Press <Quit> to terminate the transfer of data at any time.



To send control sample data to the host, the analyzer must be in Stand-By status.

If concentration is selected, only the concentration results are sent to the host. If reflectance is selected, both concentration and reflectance results are sent to the host.

Write/read control sample data to/from a diskette

This option allows for data to be saved to a diskette or for data to be read from a diskette. Control sample data are written to a diskette only for the selected level. A DOS formatted 1.44 MB diskette is needed.

► To write/read control sample data to/from a diskette

1. Press <Level> on the [Control Data Monitor] screen to select the level of controls.
2. Press <Media>. The [Control Data Monitor Media] screen is displayed.
3. Enter the range of sequence numbers to be written to a diskette, using numbers between 1 and 100. Enter 0 to write all sample data of the selected level.
4. Press <FD R/W>. The [Confirmation] window appears.
5. Press <File Type> to select the format of the files to be written/read (ASCII or binary).
6. Insert diskette.

7 Press <Write> to write data to a diskette, or press <Read> to read data from a diskette.



When reading control sample data from a diskette, all data of the selected level are read. Currently stored data with identical sequence numbers are overwritten.



Selection of concentration or reflectance data is not necessary, because both data are written or read simultaneously.

The option to read from a diskette is only available in binary format.

To write/read control sample data to/from a diskette, the analyzer must be in Stand-By status.

Delete control sample data

Sample data can be cleared from the memory either completely or selectively, within a range of sequence numbers.



Control sample data are deleted only for the level selected in the [Control Data Monitor] screen.

► To delete control sample data

1 Press <Level> on the [Control Data Monitor] screen to select the level of controls.

2 Press <Media>. The [Control Data Monitor Media] screen is displayed.

3 Enter the range of sequence numbers to be deleted using numbers between 1 and 100. Enter 0 to delete all sample data.

4 Press <Delete>. The [Confirmation] window appears.

5 Press <OK>.



To delete control sample data, the analyzer must be in Stand-By status

Switch off the analyzer

The URISYS 2400 analyzer must be in Stand-By status when it is switched off. Never switch off the analyzer when it is in any other status. Otherwise, the final rinsing procedure may be interrupted, or a sample may remain inside the pipetting system overnight, which can cause a malfunction when the analyzer is started again.

In addition, perform the required daily maintenance procedures.

👁 *"Every day" on page D-2*

1 If the analyzer is in S.Stop status as the result of an alarm, resolve the alarm, and perform a reset procedure before switching off the power.

2 Switch off the power to the analyzer.

Special operations

This chapter describes special operations.

In this chapter *Chapter* **6**

Calibration 36
Photometer calibration 36
Specific gravity (SG) calibration 40
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Barcode check 41
Printer check 41
Program check 41
Alarm trace 42
Communication trace 42
Compact memory 42
FD utilities 43

Calibration

The operator can calibrate the photometer and the SG (specific gravity) meter using the [User Calibration] screen.

Photometer calibration is based on the measurement of a calibration strip with known reflectance specifications. This must only be performed using the URISYS 2400 calibration strip manufactured by Roche Diagnostics.

Specific gravity calibration is based on the measurement of calibration solutions of known refractive indices.



Calibration procedures are only possible when the analyzer is in Stand-By status.

Under routine conditions, calibrate the photometer and the SG meter every four weeks.

Photometer calibration

The calibration values measured for each elevated area of the calibration strip are compared with the previous user calibration values measured and the factory calibration values.

If the calibration values are within ±2% of previous values, and within ±5% of the factory values, “Calibration OK” is displayed on the [Photometer Calibration] screen and the previous user calibration values are replaced.

If the calibration values differ by more than ±2% from previous values, or more than ±5% from factory values, “Calibr. Failed” is displayed on the [Photometer Calibration] screen and the calibration must be repeated.



Sample testing can only start when photometer calibration is successful. If calibration failed after several attempts, contact Technical Support.

Handle and store the URISYS 2400 calibration strips according to the instructions in the calibration strip package insert.

The calibration strip is made of grey plastic material of constant reflectance characteristics. It has nine elevated areas on the upper side, and three feet on the underside. The two outer feet fix the strip on the lateral sides of the TS

basetransfer base, while the middle one fits into a slit at th e measuring position of the TS transfer base..

Be aware that the TS transfer base, strip waste container and liquid tank may be contaminated with potentially biological hazardous material. Always wear gloves when handling these parts.

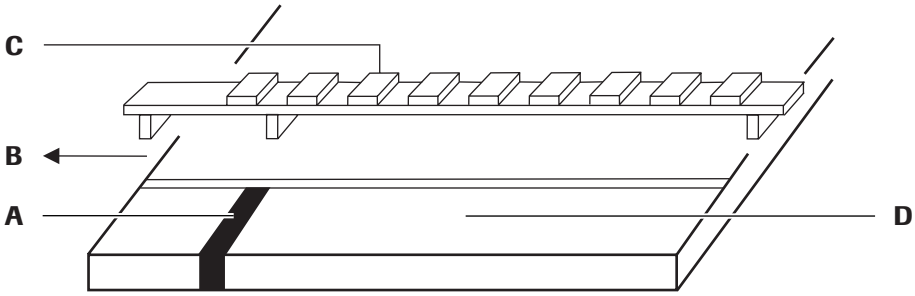

Figure C-11 Setting URISYS 2400 calibration strip

A *Slit*
B *Front of instrument*
C *Calibration strip*
D *TS transfer base*

► To insert the URISYS 2400 calibration strip

1. Open the strip waste container door.
2. Remove the strip waste container.
3. Remove the TS transfer base and place it on the lab desk.
4. Raise the holding grid.
5. Take a calibration strip out of the vial and position it on the TS transfer base as indicated above.

   👁 *Figure C-11*

   Make sure that the feet of the strip are locked in the correct place, the middle foot being set to the end of the slit.

   👁 *"Figure C-12" on page C-38*

6. Lower the holding grid.
7. Insert the TS transfer base smoothly to its end position and ensure that it is positioned correctly. Turn the screw on the transfer base until it locks to secure the base.
8. Insert the strip waste container.
9. Close the strip waste container door.



Figure C-12 Correct position of the calibration strip on the TS transfer base

A *Calibration strip*

B *Holding grid*

C *Slit*

► To calibrate the photometer

1. Press <Menu> on the [Routine Monitor] screen. The [Menu] screen is displayed.
2. Press <Tools>. The [Tools] screen is displayed.
3. Press <User Calibration>. The [User Calibration] screen is displayed.
4. Press <Photometer Calibration>. The [Photometer Calibration] screen is displayed.

   The current values are displayed on the screen. The previous values are displayed in parentheses.
5. Press <Calibrate>. The [Photometer Calibration] window appears.
6. Press <Execute>. A confirmation window appears.

When the calibration process is completed, the new calibration values are displayed on the screen with the previous values in parentheses. “Calibration OK” or “Calibr. Failed” is shown on the second line of the [Photometer Calibration] screen.

The screen shows the measured areas of the calibration strip assigned to the corresponding test parameters of the test strip (COM = compensation pad, ERY = Erythrocytes, and so on) with reflectance values and the wavelength

used for measurement (B = blue 470 nm, G = green 555 nm, O = orange 620 nm).

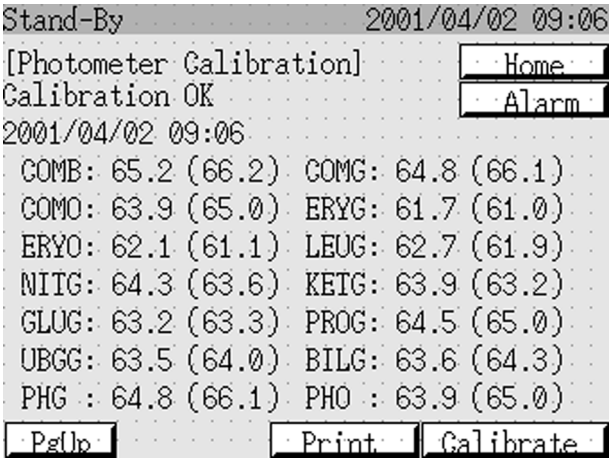

Figure C-13 Photometer Calibration screen

If the calibration failed, an alarm message appears. Repeat the calibration with another calibration strip from the vial.

In case of "Calibr. Failed", the values out of range are displayed with an asterisk on the screen and the printout.

Insert the new calibration strip correctly and press <Calibrate>, followed by <Execute> in the confirmation screen.

► To print calibration values

1. Press <Print> to print the calibration values. A confirmation window appears.
2. Press <Execute> to confirm. The calibration data are printed.
3. Press <Home> to return to the [Routine Monitor] screen.

Specific gravity (SG) calibration

The specific gravity of the sample changes with temperature. Since the URISYS 2400 analyzer measures the temperature of the flow cell, there may be a difference in temperature between the sample and the flow cell. Therefore, the temperature of the urine sample and the calibration solutions must always be at room temperature.

► To prepare the calibration solutions

Use deionized water and reagent-grade NaCl to prepare the following solutions, and place them in a rack:

Positions 1 and 3	Deionized water
Positions 2 and 4	NaCl solution 10.0 g/dL
Position 5	NaCl solution 5.0 g/dL

Set the rack on the input line.

► To calibrate the SG meter

1. Press <Menu> on the [Routine Monitor] screen. The [Menu] screen is displayed.
2. Press <Tools>. The [Tools] screen is displayed.
3. Press <User Calibration>. The [User Calibration] screen is displayed.
4. Press <SG Calibration>. The [SG Calibration] screen is displayed.
5. Press <Calibrate>. The [SG Calibration] window appears.
6. Press <Execute>.



After the calibration process is completed, "Calibration OK" or "Calibr. Failed" is displayed on the [SG Calibration] screen. If "Calibr. Failed" is displayed, repeat the SG calibration.

Sample analysis can start even if the SG calibration is unsuccessful. If SG calibration is unsuccessful, the previous calibration values are used.

Checks

The operator can perform a variety of checks by using the [Tools] screen. These include a barcode check, printer check, and program check. The analyzer must be in Stand-By status.

Barcode check

Using this option, barcodes of racks and sample tubes can be read and the barcode numbers can be printed out. To use this function, the barcode reader must be set to “Enabled”.

“System parameters” on page B-24

► To check the barcode

1. Press <Tools> on the [Menu] screen. The [Tools] screen is displayed.
2. Place the rack, if required, with sample tubes with barcode labels on the rack input line.
3. Press <Barcode Check>. The [Barcode Check] window is displayed.
4. Press <Execute>.
5. After completing the reading of barcodes, the barcode numbers are printed.

Printer check

This option checks the appearance of the printout of characters.

► To check the printer

1. Press <Tools> on the [Menu] screen. The [Tools] screen is displayed.
2. Press <Printer Check>. The [Printer Check] window appears.
3. Press <Execute>. A list of characters is printed.

Program check

This option checks the actual software version installed on the analyzer.

► To check the program

1. Press <Tools> on the [Menu] screen. The [Tools] screen is displayed.
2. Press <Program Check>. After approximately 30 seconds, the [Program Check] window appears, displaying the program version and language version, and their check sum.
3. Press <Execute> to print the program version, or <Cancel> to return to the [Tools] screen.

Alarm trace

For more information, see:

"Handle alarms" on page E-3

Communication trace

This option allows activation of the communication trace. The HOST connection must be deactivated.

"To activate/deactivate the connection to the host computer" on page C-7

► To activate the communication trace

1. Press <Tools> on the [Menu] screen. The [Tools] screen is displayed.
2. Press <Comm. Trace>. The [Comm. Trace] screen is displayed.
3. Press <Trace ON/OFF>. The [Trace ON/OFF] window appears.
4. Press <Trace ON/OFF> to activate/deactivate the communication trace. If "Trace ON" is displayed on the button, the communication trace function is activated.
5. Press <Cancel> to return to the [Comm. Trace] screen.
6. Press <Print Trace>. The [Print Trace] window appears.
7. Press <Execute> to print the communication trace log file.
8. Press <Clear Trace>. The [Clear Trace] window appears.
9. Press <Execute> to clear the communication trace log file.

Compact memory

This option allows for compacting the memory of the analyzer.

► To compact the memory

1. Press <Tools> on the [Menu] screen. The [Tools] screen is displayed.
2. Press <Compact Memory>. The [Compact Memory] window is displayed.
3. Press <Execute>.

FD utilities

This option allows for formatting a diskette and cleaning the disk drive.

► To use FD utilities

1. Press <Tools> on the [Menu] screen. The [Tools] screen appears.
2. Press <FD Utilities>. The [FD Utilities] screen appears.
3. Press <Format FD>. The [FD Format] window appears.
4. Insert a 1.44 MB diskette into the diskette drive.
5. Press <Execute> to format the diskette.
6. When formatting is completed, remove the diskette from the diskette drive.



If the diskette drive needs to be cleaned, contact Technical Support.

Maintenance D

Part D describes all maintenance procedures relating to the URISYS 2400.

General maintenance actions

This chapter explains general maintenance procedures for the URISYS 2400.

In this chapter *Chapter* **7**

Maintenance procedures 2
Every day 2
Every week 3
Every month 3
Every three months 3
Maintenance menu 4
Wash the liquid handling system 4
Clean the TS transfer base 6
Empty the strip waste container 6
Empty the liquid waste tank 6
Clean the external parts of the analyzer 7
Air purge 7
Exchange user-replaceable parts 8
Replace syringe seals 8
Exchange mains fuses 15

Maintenance procedures

The URISYS 2400 analyzer requires proper care and attention. Regular maintenance ensures that excessive contamination of the analyzer is avoided and that the analyzer works reliably.



Handle liquid waste and used test strips properly, and according to legislation on water pollution, and treatment of drainage and waste matter.



Spilled chemicals and samples must be wiped up immediately. It is especially important to protect the plug connections from contamination.



Carefully follow the procedures specified in the Operator's Manual for the operation and maintenance of the analyzer. Leave maintenance of other areas to the Roche Technical Support.

Every day



Be aware that the TS transfer base, strip waste container and liquid waste tank may be contaminated with potentially hazardous material. Always wear gloves when handling these parts.

The following are maintenance procedures to be performed daily:

- Execute the wash procedure when work has ended for the day.
- Clean the TS transfer base.
- Empty the strip waste container.
- Empty the liquid waste tank.

Every week

The following are maintenance procedures to be performed weekly:

- Check the water supply filter for growth of bacteria or algae.
- Clean the rack input line.
- Clean the rack trays.

Every month

The following are maintenance procedures to be performed monthly:

- Clean the outer parts (housing) of the analyzer.
- Clean or change the water supply filter.

Every three months

The following is the maintenance procedure to be performed every three months:

- Change the seals on both syringes.



Unplug the analyzer when changing the seals on the syringes.

"Replace syringe seals" on page D-8.

Maintenance menu

Using the [Maintenance] screen, the operator can perform general maintenance tasks, such as washing the liquid handling system, exchanging the URISYS 2400 cassette, resetting the analyzer, and removing air bubbles. Maintenance procedures are only possible when the analyzer is in Stand-By status.

Wash the liquid handling system

Clean the liquid handling system (sample needle, flow cell, and internal tubing) every day, before the analyzer is switched off. Use a recommended washing solution, for example, MultiClean, and the "Wash" procedure of the analyzer to prevent contamination and urinary deposits in the liquid handling system. Change the washing solution daily.

There are two methods for executing the wash procedure:

- Use the wash rack on the rack input line.
- Use the washing solution at the STAT position.

► To use the wash rack on the input line

1 Register the wash rack ID number to be used for the wash procedure.

👁 *"Register the wash rack" on page B-27*

2 Place a sample tube containing 10 ml of washing solution at position 1 of the registered rack, and set the rack on the rack input line.

3 If the analyzer is in Operation status, the rack is automatically transferred to the cross-feed line and its barcode recognized by the barcode reader; the wash procedure is then performed.

4 If the analyzer is in Sampling Stop or Stand-By status, press <Start> to feed the wash rack.

5 When the wash procedure is complete, the analyzer moves to Stand-By status. Remove the wash rack from the rack output line and dispose of the washing solution.

Do not use the registered wash rack for routine or control samples.
If the washing cycle is interrupted, carry out the wash procedure again from the beginning. Otherwise, the remaining detergent in the flow path may damage the instrument or cause incorrect data.
When the <Stop> button on the [Routine Monitor] screen is pressed during the wash procedure, a [Warning] window alerts the operator to the risks of interrupting the washing process.

After a washing procedure, the instrument must be re-started manually by pressing <Start> in the [Routine Monitor] screen.

► To use the washing solution at the STAT position

1. Set the analyzer to Stand-By mode.
2. Place a sample tube containing 10 ml of washing solution at position 1 of a sample rack, and set the rack in the STAT position.
3. Press <Menu> on the [Routine Monitor] screen. The [Menu] screen is displayed.
4. Press <Maintenance>. The [Maintenance] screen is displayed.
5. Press <Wash>. The [Wash] window appears.
6. Press <Execute> to start the wash procedure. A second [Wash] window appears with the message “Executing”.



When handling the washing solution, ensure that you wear gloves and safety goggles to avoid direct contact with the solution. If the solution contacts the body, wash immediately with a large volume of water. Consult your laboratory protocol for handling biohazard materials. If a sample is spilled on the analyzer, wipe up immediately and apply disinfectant.



Do not remove the rack with the washing solution until the wash procedure is finished.
If the washing cycle is interrupted, carry out the wash procedure again from the beginning. Otherwise, the remaining detergent in the flow path may damage the instrument or cause incorrect data.
When the <Stop> button on the [Executing] window is pressed, a [Warning] window alerts the operator to the risks of interrupting the washing process.

Clean the TS transfer base

When cleaning the TS transfer base, the analyzer must be in Stand-By status.

The TS transfer base must be cleaned every day to prevent contamination and deposits, and to ensure that test strips are processed accurately.

1. Open the strip waste container door.
2. Remove the waste container.
3. Loosen the screw on the TS transfer base and pull the base out of the analyzer.
4. Clean the base under running water. If necessary, wipe it with a cloth or gauze moistened with a neutral detergent. Wipe the grooves with a cotton swab. Use a disinfectant if required.
5. Dry the TS transfer base with a lint-free cloth if analysis is to continue immediately after cleaning.
6. Insert the TS transfer base smoothly to its end position, and ensure it is positioned correctly.
7. Turn the screw on the base until it locks to secure the base.



Do not use acid or alkaline detergents. Do not scratch the surface of the TS transfer base.

Empty the strip waste container

Empty the strip waste container at the end of daily measurements. If more than 350 strips are measured without emptying the container, a warning alarm appears. After 400 strips, the analyzer returns to S.Stop status. Empty the waste container. If the waste container is not emptied, further measurements are not possible.



Do not open the strip waste container door during analysis. Otherwise, the analyzer stops and moves to Stand-By status.



Opening of the strip waste container door resets the counter of processed strips to zero.

Empty the liquid waste tank

Empty the liquid waste tank at the end of daily measurements, or whenever the water supply tank is refilled.

To prevent overflow of the liquid waste tank, it is recommended to install an overflow sensor.

"Installation" on page B-5

Clean the external parts of the analyzer

Use a cloth dampened with water or with a liquid cleaning agent to clean the rack input line, the rack trays, and the outer surface of the analyzer. Apply a disinfectant if necessary.

For cleaning the touch screen, switch off the analyzer. Wipe the touch screen with a dry cloth.

If contamination is heavy, clean with a cloth moistened with a neutral detergent.



Do not use volatile solvents such as benzene. Do not scratch the surface of the touch screen.

Air purge

The air purge function is used to remove air bubbles from the syringes, flow cell, internal tubing, and sample needle. During first time installation, this function is used to fill the water supply tube and the liquid handling system with deionized water.

In addition, use the air purge function after refilling the water supply tank and if air bubbles are present in the syringes.

► To remove air bubbles

1. Set the analyzer to Stand-By mode.
2. Press <Menu> on the [Routine Monitor] screen. The [Menu] screen is displayed.
3. Press <Maintenance>. The [Maintenance] screen is displayed.
4. Press <Air purge>. The analyzer performs several rinsing cycles.
5. Press <Execute>.

Exchange user-replaceable parts

Replace syringe seals

A worn seal piece allows liquid to leak, thereby affecting the accuracy of the pipetted volumes. It is recommended that the Sample- and Wash-syringe seals be changed every three months.

Roche Technical Support will replace these seals during scheduled maintenance visits. For additional replacements between scheduled maintenance visits, follow the procedure below.



Unplug the analyzer when changing the seals on the syringes.



Any component that comes into contact with sample fluids is potentially biohazardous, and should be handled in an appropriate manner. Wear clean protective gloves when changing Syringe seals.

Materials required are:

- ☐ S-syringe seal
- ☐ W-syringe seal
- ☐ Spanner wrench
- ☐ Absorbent towels
- ☐ Gauze squares
- ☐ Distilled or deionized water
- ☐ 70% isopropyl alcohol



The gauze absorbs liquid that drains from the tubing as it is disconnected.

► To disassemble the syringe

Do not open the syringe cover while the power switch is turned on. Otherwise your fingers may be snagged with moving parts.

1. Loosen the screw of the syringe cover below the W/S syringes and remove it.
2. Disconnect the tubing at the top of the syringe by turning the small, colorless tube-retaining nut counterclockwise.
3. Place a dry absorbent gauze under the small, colorless tube-retaining nut that is connected to the side of the lower blue part of the syringe and disconnect this side-tube (some water will flow out of the side connection of the syringe).

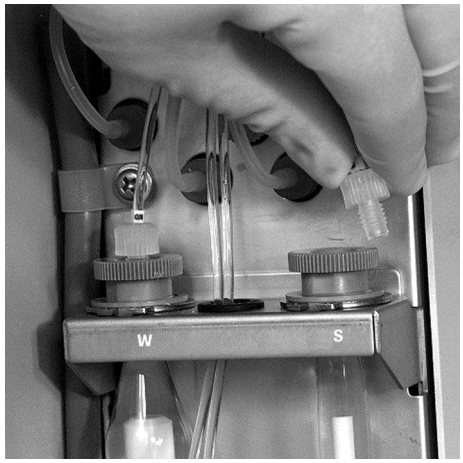

Figure D-1 Loosening top-tube retaining nut

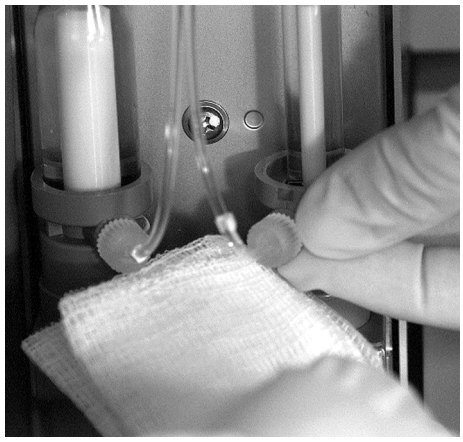

Figure D-2 Disconnecting side tubing

4 Loosen the blue knurled locking screw at the top of the syringe assembly that fixes the glass barrel of the syringe by turning it counterclockwise.

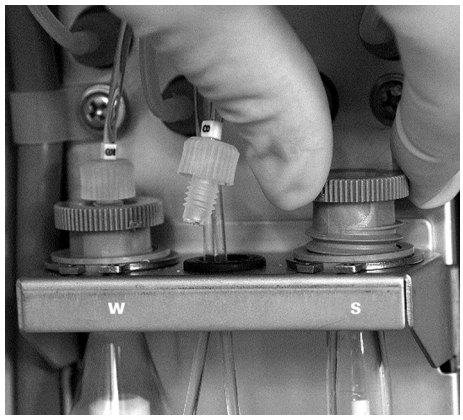

Figure D-3 Loosening knurled locking screw

5 For the W-syringe, loosen and remove the locking screw completely to prevent damage to the glass barrel.

6 Pull the plunger down sufficiently so that you can lift out the glass barrel. Then remove the glass assembly.

7 Carefully pull the syringe assembly out of its mounting block. Support the glass barrel with one hand; with the other hand, grasp the syringe holder, lifting it up and out to remove the assembly.

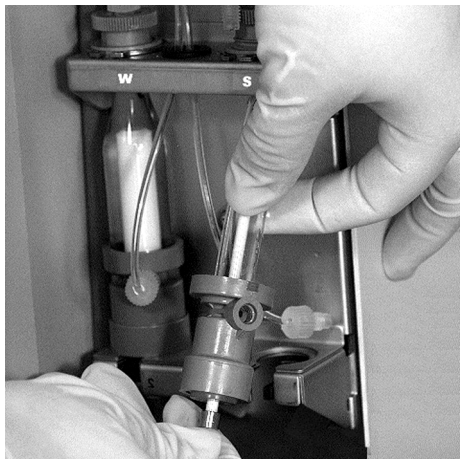

Figure D-4 Removing syringe assembly

8 Remove the glass syringe barrel and remove the O-ring that fits below the syringe barrel. Place both components in a safe place.

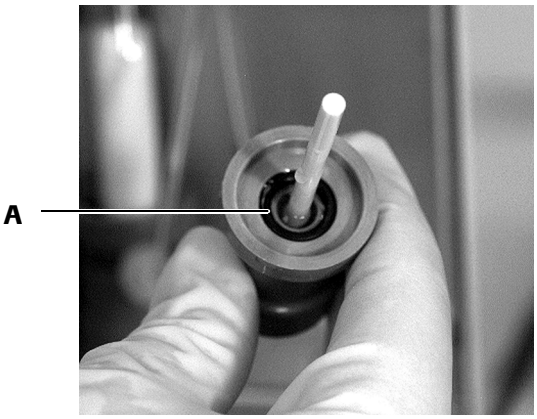

Figure D-5 Removing O-ring

A *O-ring below barrel*

► To expose the syringe seal

1 Turn the syringe holder upside down and expose the plunger retaining screw.

2 Apply a spanner wrench to the plunger retaining screw and turn the screw counterclockwise until it is loose.

3 Turn the syringe holder right side up and carefully lift the syringe holder from the plunger. Leave the plunger intact.



Figure D-6 Removing syringe holder

► To replace the syringe seal

1. Remove the seal piece, press piece, spring, and retaining screw from the plunger. Discard the seal piece.
2. Wipe the plunger with a gauze square soaked in 70% isopropyl alcohol to remove any debris, followed by a gauze square soaked in distilled or deionized water.
3. Ensure that the retaining screw, spring and press piece are properly positioned on the plunger. Place the new seal on the plunger and check that the rounded end is facing downwards.

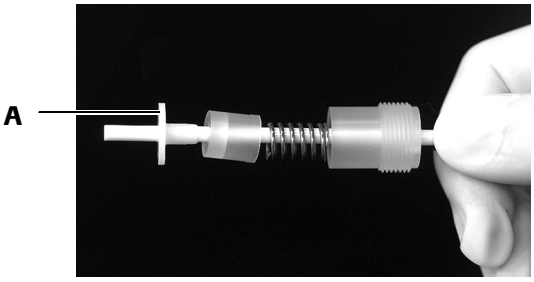

Figure D-7 Removing S-syringe seal piece

A *Seal piece*

4. Place the plunger back in the syringe holder with the syringe vertically oriented. Tighten the retaining screw with the spanner wrench until the screw is snug with the syringe holder.

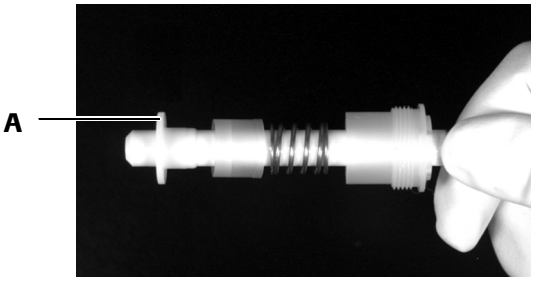

Figure D-8 Removing W-syringe seal piece

A *Seal piece*

!

Do not overtighten the syringe retaining screw.



Figure D-9 Tightening the retaining screw

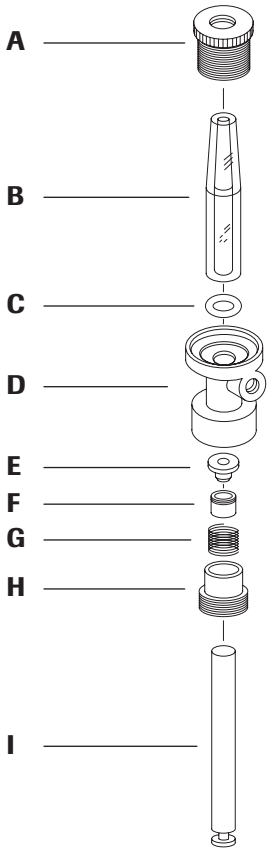

Figure D-10 Syringe assembly order

A *Locking screw*
B *Glass barrel*
C *O-ring (syringe holder)*
D *Syringe holder*
E *Seal*
F *Press piece*
G *Spring*
H *Retaining screw*
I *Plunger*

► To reassemble the syringe

1. Place the syringe holder O-ring into the syringe holder. If the O-ring appears damaged or worn, replace it.
2. Inspect the glass syringe barrel for chips or cracks at the top and bottom. If the syringe barrel is etched or damaged in any way, replace it. Ensure that the barrel and the syringe holder are dry. Place the syringe barrel over the plunger and onto the syringe holder.
3. Return the syringe holder onto its mounting block by tilting the top of the syringe towards the instrument. Ensure that the syringe holder is in the recess on the top surface of the mounting block.

!

If the syringe holder is not properly seated in its mounting block recess, damage to the syringe assembly may occur.

4. Rotate the syringe holder until the side tube port is aligned to accept the syringe side-tubing. Check if the blue syringe base correctly fits into the well of the metal support plate.
5. Tighten the top knurled locking screw with your fingers. Ensure that the syringe assembly is seated correctly and that the glass barrel O-ring is properly positioned.
6. Reconnect the top tubing of the syringe and tighten the retaining nut with your fingers.

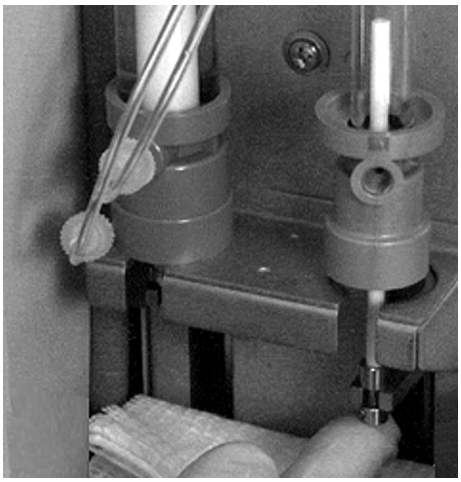

Figure D-11 Securing plunger in notch

7. Reconnect the side tubing and tighten the retaining nut with your fingers.
8. Turn the analyzer on.

9 Perform "Air Purge", if necessary more than once, to fill the syringe with water and to get rid of any remaining air bubbles.

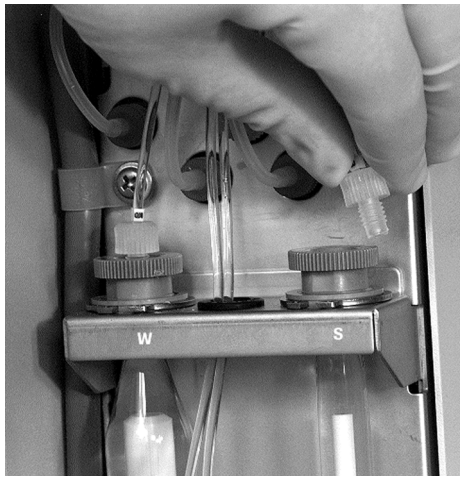

Figure D-12 Replacing the retaining nut

The top and side tubing retaining nuts can be damaged if excessive force is applied when replacing them. Take care not to cross-thread these nuts.
Looseness of the retaining nut may result in incorrect data. Tighten the retaining nut securely by hand while being careful about the packing orientation.

Exchange mains fuses

► To exchange mains fuses

1 Set the main switch to OFF position.

2 Remove the power cord from the power inlet socket of the instrument.

3 Remove the fuse socket located directly below the power inlet socket of the instrument.

4 Exchange the fuse(s) as necessary.

5 Reinsert the fuse socket.

6 Reinsert the power cord into the power inlet socket of the instrument and set the main switch to ON.

Use only fuses that are specified in this Operator Manual, (see "Technical specifications" on page F-2). The use of other fuses is a breach of the warranty.

Troubleshooting E

Part E lists and describes the meaning of the alarm flags which are shown by the URISYS 2400.

Data alarms (flags)

This chapter describes the data alarms that appear on printouts, and explains how to handle alarms and reset the analyzer..

In this chapter *Chapter* **8**

Flags on result data printout 2
Handle alarms 3
Alarm levels 3
Switch the alarm buzzer on and off 4
Alarm menu 5
Reset the analyzer 9
Start 9

Flags on result data printout

The result data that are printed must be checked for flags. There can be different flags next to the data, in order to bring some of the values to the attention of the operator. Flags on result data printout are outlined below.

Flag	Data alarm	Explanation	Appearance on printout
S	Sieve	Test parameter result corresponds to sieve criteria settings	After the value
*	Abnormal	Test parameter result corresponds to abnormal criteria settings	Before the value
O	Specific gravity (SG) out of range	Result is greater than 1.050 or less than 1.000	Instead of SG value
I	SG value invalid	Refraction position is not definite	Instead of SG value
T	SG error	Hardware error	Instead of SG value
#	Changed range value	Initial range table is changed	After the value
!	Edit	Data have been edited	After the value

Table E-1 Flags on result data printout

Flag	Sample alarm	Explanation	Appearance on printout
E	Sample empty	No sample detected	Instead of value
N	Sample short	Sample volume below limit	Instead of value
R	Test strip	Test strip error	Instead of value

Table E-2 Sample alarm flags

Handle alarms

The [Alarm monitor] screen displays up to four alarms.

When more than four messages are generated, press <Alarm Trace> on the [Tools] screen to print the alarm codes and the times at which they occurred.

When the analyzer is switched on and in Stand-by status, any displayed alarm must be checked, solved and cleared before next samples are processed.

If any errors have occurred during the setting of parameters, the message does not appear until <Start> is pressed.

If the analyzer comes to an emergency stop due to an error, execute the reset function on the [Maintenance] screen after resolving the alarm cause.

Alarm levels

The main alarm levels are WARNING, S.STOP, STOP, and E.STOP.

WARNING Although this warning is issued, the analyzer continues to measure samples. After completion of the current sampling, check the alarm condition, and take the action outlined.

S.STOP Only the sampling sequence is stopped. For samples in process, measurement continues and the result data are generated. Check the alarm condition, take the action outlined, and restart the operation.

STOP The analyzer stops at the end of its current, 15-second instrument cycle. For samples in process, measurement, result data printing and host communication stop immediately. Check the alarm condition, and take the action outlined. Check the results for the last samples that were processed before the alarm message appeared. Reset all samples that were processed but not measured/ printed/ sent to host and repeat the processing of these samples.

E.STOP The analyzer stops instantly (15-second instrument cycle is NOT finished). For samples in process, measurement, result data printing and host communication stop immediately. Check the alarm condition and take the action outlined. Execute the reset function on the [Maintenance] screen after resolving the alarm cause. Check the results for the last samples that were processed before the alarm message appeared. Reset all samples that were processed but not measured/ printed/ sent to host and repeat processing of these samples.

Switch the alarm buzzer on and off

When an alarm is generated, the <Alarm> button that is displayed on the screen flashes and, if the alarm buzzer is on, an audible alarm is heard. These alarms should be cleared after taking the countermeasures before restarting the instrument. The countermeasures are outlined in:

👁 *"Instrument alarms (messages)" on page E-12*

When the <Alarm> button is pressed, an [Alarm Monitor] window appears that provides details of the alarm level, alarm category, and countermeasures.

The [Alarm Monitor] screen is also used to:

- Switch the buzzer on and off.
- Display the name of the alarm.
- Clear alarms.

► To switch the alarm buzzer on and off

1. Press <Alarm> on the current screen. The [Alarm Monitor] window appears.
2. Check the alarm name and code that are indicated.
3. Press <Buzzer ON> to silence the alarm and to change the name of the button to <Buzzer OFF>.
4. Press <Buzzer OFF> to reset the buzzer to <Buzzer ON> for the next alarm.
5. Check the message on the screen, and take the appropriate countermeasures.
6. Press <Clear Alarm>, when the alarm has been resolved.
7. Press <Close> to close the window.
8. Print an alarm log, if required.

👁 *"Alarms" on page E-12*

Alarm menu

Using the <Alarm Trace> button on the [Tools] screen, the operator can perform the following procedures:

- Print a list of the alarms for that day (last alarm printed first).
- Print a list of cumulative alarms (current day printed first).
- Download alarm lists from the analyzer to a diskette.
- Clear alarms.



When an alarm is generated, it is stored in the memory.

► To print a list of the alarms for that day

1. Press <Menu> on the [Routine Monitor] screen. The [Menu] screen is displayed.
2. Press <Tools>. The [Tools] screen is displayed.
3. Press <Alarm Trace>. The [Alarm Trace] screen is displayed.
4. Press <Print Daily Alarm>. The [Print Daily Alarm List] window appears.
5. Press <Execute>.
6. Press <Stop> to cancel printing at any time

.

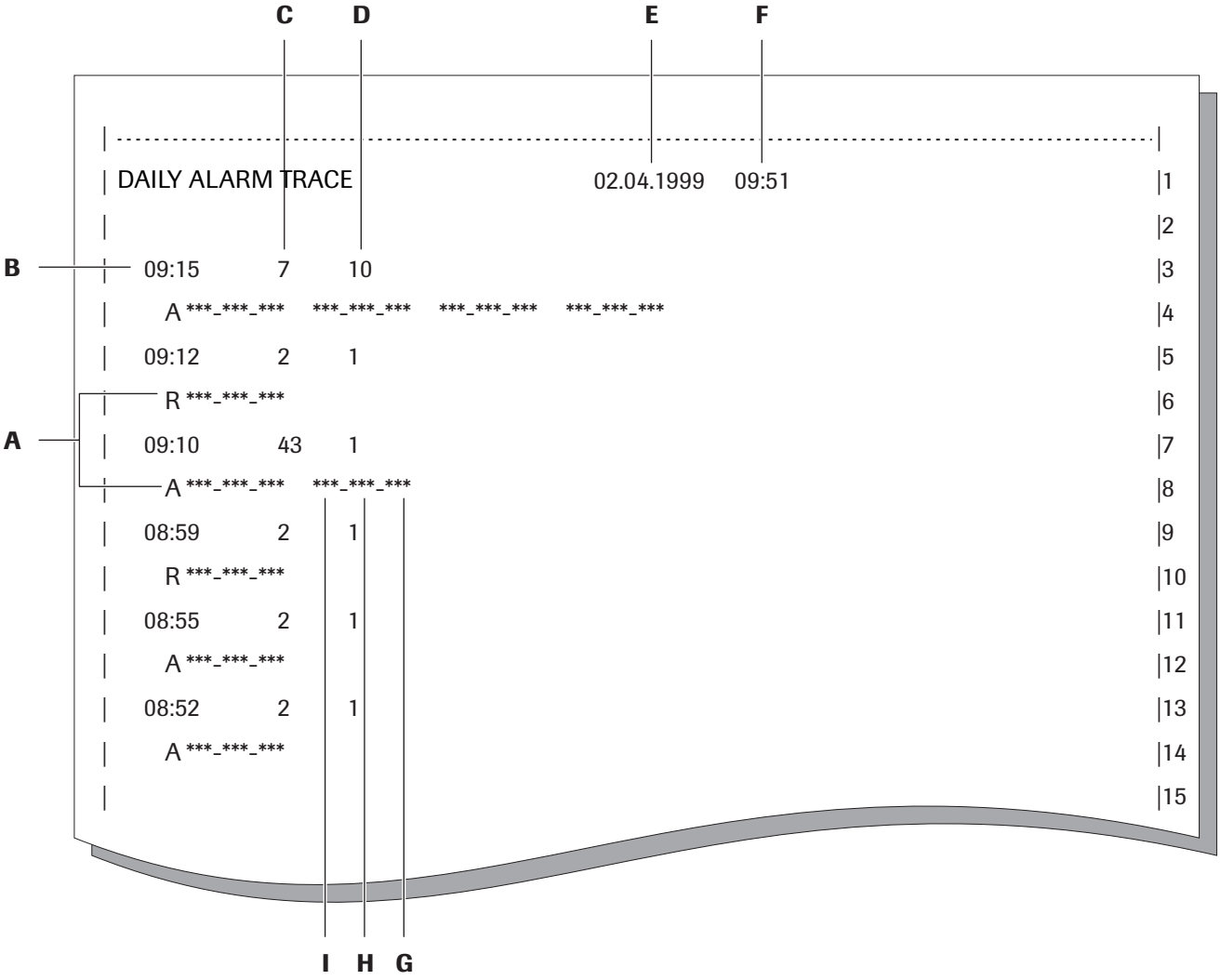

Figure E-1 Example of a printout of daily alarm list

A *Identification flag (A: Alarm, R: Retry)*

B *Generation time*

C *State of instrument*

D *Generation frequency*

E *Printing date*

F *Printing time*

G *Generation time in cycle time (ms x 100)*

H *Sub category code or retry frequency*

I *General category code or retry code*

► To print a cumulative list of alarms

1. Press <Menu> on the [Routine Monitor] screen. The [Menu] screen is displayed.
2. Press <Tools>. The [Tools] screen is displayed.
3. Press <Alarm Trace>. The [Alarm Trace] screen is displayed.
4. Press <Print Cumulative Alarm>. The [Print Cumulative Alarm List] window appears.
5. Press <Execute>.
6. Press <Stop> to cancel printing at any time.

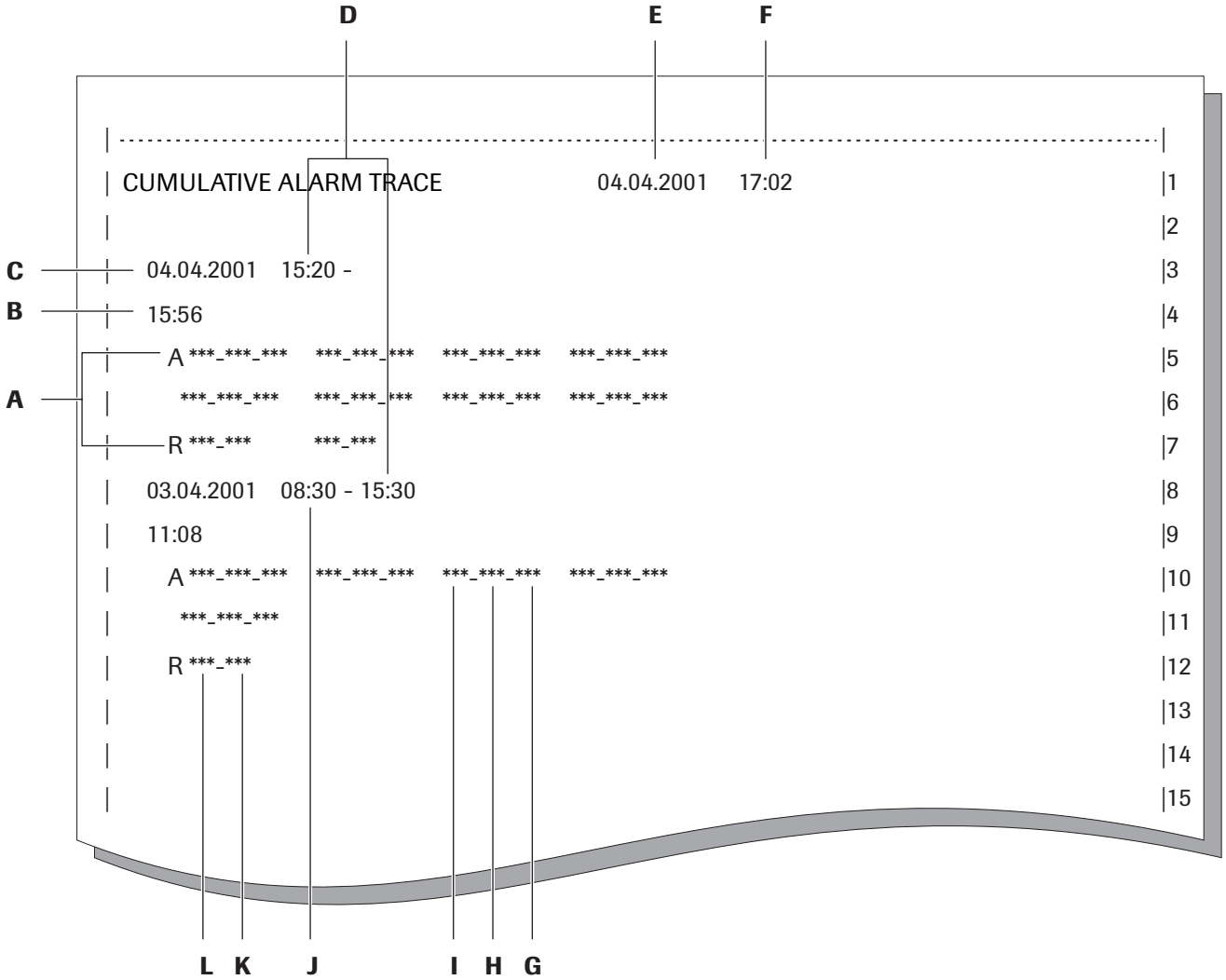

Figure E-2 Example of a printout of cumulative alarm list

A *Identification flag (A: Alarm, R: Retry)*
B *Generation time*
C *Alarm date*
D *Power on time*
E *Printing date*
F *Printing time*
G *Generation frequency*
H *Sub category code*
I *Generation time*
J *Power off time*
K *Retry code*
L *Retry frequency*

► To download alarm lists from the analyzer to a diskette

1. Press <Menu> on the [Routine Monitor] screen. The [Routine Monitor] screen is displayed.
2. Press <Tools>. The [Tools] screen is displayed.
3. Press <Alarm Trace>. The [Alarm Trace] screen is displayed.
4. Place diskette into diskette drive.
5. Press <FD write>. The [FD write] window appears.
6. Press <Execute>.

► To clear alarms

1. Press <Menu> on the [Routine Monitor] screen. The [Routine Monitor] screen is displayed.
2. Press <Tools>. The [Tools] screen is displayed.
3. Press <Alarm Trace>. The [Alarm Trace] screen is displayed.
4. Check the message.
5. Press <Clear Alarm>. The [Clear Alarm List] window appears.
6. Press <Cumu.> to clear the cumulative alarm list.
7. Press <Daily> to clear the daily alarm list.



- *The maximum number of daily alarms that can be stored is 255 logs or 10 types. The maximum number of cumulative alarms that can be stored is 255 logs or 20 types.*
- *Switching the power supply on or off is counted once.*
- *When the date is changed or the power supply is switched off, the daily alarm log is cleared.*

Reset the analyzer

The reset procedure is used as a troubleshooting tool.

► To reset the analyzer

1. Press <Menu> on the [Routine Monitor] screen. The [Menu] screen is displayed.
2. Press <Maintenance>. The [Maintenance] screen is displayed.
3. Press <Reset>. The [Reset] window appears.
4. Press <Execute> to start the resetting.

During Reset, the analyzer clears unprocessed racks from the cross-feed line, discards test strips still present on the TS transfer base, performs a rinsing cycle of the liquid handling system and resets these modules to their home position.

Start

If the analyzer does not switch on at all, check that:

- The main power is on.
- The power cable is connected properly.

Contact Technical Support if the analyzer still does not respond.

Reset the analyzer

Instrument alarms (messages)

In this chapter the instrument alarms are described.

In this chapter *Chapter* **9**

Instrument alarms (messages) 12
Alarms 12

Instrument alarms (messages)

This list shows the messages that can be acted on by the operator. If the screen shows an alarm code that is not mentioned in this list, contact Technical Support.

Alarms

Category	Alarm name Type of error	Subcategory	Level	Check and countermeasure
1	**S.Probe** Sample Probe Error	1, 3, 5	S.STOP	1. Execute the reset procedure. 2. If the condition cannot be restored to normal, contact Technical Support.
		2, 4, 6, 8-9, 12-13	STOP	1. Execute the reset procedure. 2. If the condition cannot be restored to normal, contact Technical Support.
		7	S.STOP	1. Clean the tip of the sample probe. 2. Check the sample probe and the electrode for damage, or whether they are in contact with each other. 3. If the condition cannot be restored to normal, contact Technical Support.
		11	STOP	1. Check whether the liquid waste tank is full, or the waste flow path is blocked.
2	**TS Cassette** Test Strip Cassette Mechanism Error	1-7	STOP	1. Confirm whether a test strip is misplaced in the cassette mechanism. Remove the test strip as required. 2. Execute the reset procedure. 3. If the condition cannot be restored to normal, contact Technical Support.
		8-9	WARNING	1. Close the URISYS 2400 cassette compartment door. 2. If the condition cannot be restored to normal, contact Technical Support.
		10-11	WARNING	1. Insert a URISYS 2400 cassette, shift it to the rear and execute Initial or Test on the [TS Cassette] screen.
		12-14	STOP	1. Execute the reset procedure. 2. If the condition cannot be restored to normal, contact Technical Support.

Table E-3 Instrument Alarms (messages)

Category	Alarm name Type of error	Subcategory	Level	Check and countermeasure
3	**Supply Line** Rack In Error	1-5, 7	S.STOP	1. Execute the reset procedure. 2. If the condition cannot be restored to normal, contact Technical Support.
		6	STOP	1. Place the rack for SG. 2. Execute SG calibration again.
4	**Crossfeed Line** Rack Crossfeed Line Error	1-6	S.STOP	1. Execute the reset procedure. 2. If the condition cannot be restored to normal, contact Technical Support.
5	**Stock Line** Rack Out Line Error	1-3		1. Execute the reset procedure. If the condition cannot be restored to normal, contact Technical Support.
		4	STOP	1. Place the rack tray on the rack input line.
		5	S.STOP	1. Place the rack tray on the rack input line.
6	**Photometer** Photometer Error	1-2, 4	STOP	1. Execute the reset procedure. 2. If the condition cannot be restored to normal, contact Technical Support.
7	**TS Transfer** Test Strip Transport Error	1-7	STOP	1. Execute the reset procedure. 2. If the condition cannot be restored to normal, contact Technical Support.
8	**S.Syringe** Sample Syringe Error	1-2	STOP	1. Execute the reset procedure. 2. If the condition cannot be restored to normal, contact Technical Support.
9	**Waste Box** No Waste Box	1	WARNING	1. Insert the strip waste container into the analyzer. 2. Restart.
		2	STOP	1. Insert the strip waste container. Insert the strip waste container into the analyzer.
10	**Waste Box full** Full Waste Box Error	1	WARNING	1. Empty the strip waste container. 2. Insert the strip waste container into the analyzer.
		2	S.STOP	1. Empty the strip waste container. 2. Insert the strip waste container into the analyzer.
11	**Fuse** Fuse Blown Error	1-3	E.STOP	1. Contact Technical Support.

Table E-3 Instrument Alarms (messages) (continued)

Category	Alarm name Type of error	Subcategory	Level	Check and countermeasure
12	**DC Power** DC Power Supply Error	1-2	STOP	1. Contact Technical Support.
		3	E.STOP	1. Contact Technical Support.
13	**Water Supply Tank** Water Sensor Error	1	STOP	1. Check that the cable is connected. Switch off the power. 2. Attach the connector to the water supply tank. 3. Switch on the power.
14	**Short of water** No Water Error	1	S.STOP STOP	1. Check the float switch. 2. Add rinsing water to the water supply tank, and try to restart.
		2	WARNING	1. Check the float switch. 2. Add rinsing water to the water supply tank, and try to restart.
15	**Liquid Waste Tank** Waste Sensor Error	1	STOP	1. Check that the cable is connected. 2. Switch off the power. 3. Attach the connector to the liquid waste tank. 4. Switch on the power.
16	**Liquid Waste Tank full** Full Waste Error	1	S.STOP	1. Empty the liquid waste tank.
17	**Watch Dog Timer** Timing Error	1	E.STOP	1. Create a backup file of alarm trace data on a new diskette, by executing the FD write procedure on the [Alarm Trace] screen. 2. Contact Technical Support.
19	**TS Cassette empty** No Test Strip	1	S.STOP	1. Replace the URISYS 2400 cassette.
		2	WARNING	1. Test Strip number below alarm level
		3	WARNING	1. Test Strip number below alarm level
20	**STAT Position** STAT Position Error	1	WARNING	1. Place the STAT sample at the STAT sampling position, and request a STAT measurement.
		3	WARNING	1. Place the washing solution at the STAT sampling position, and perform the wash procedure.

Table E-3 Instrument Alarms (messages) (continued)

Category	Alarm name Type of error	Subcategory	Level	Check and countermeasure
21	**Motor Controller** Motor Error	1-17	STOP	1. Contact Technical Support.
22	**Motor Time-out** Motor Error	1-17	STOP	1. Contact Technical Support.
23	**Sample Short** Sample Volume Error	1	WARNING	1. Probe does not detect sufficient sample. Add more sample, and measure again. 2. If there is sufficient sample volume, and there is still an alarm, clean the probe assembly.
		2	STOP	1. Probe does not detect sufficient sample. Add more sample, and measure again. If there is sufficient sample volume, and there is still an alarm, clean the probe assembly.
24	**No more racks** Last Rack Processed	1	WARNING	1. Processing of the last rack has been completed, and there are no more racks on the input line.
25	**Rack Barcode** Rack Barcode Label Error	1	S.STOP	1. Check whether the barcode label is dirty. 2. Check whether the barcode is positioned correctly. 3. Check whether the barcode label is missing. 4. Check whether the barcode label has the correct type of code. 5. Contact Technical Support.
		2	S.STOP	1. The rack barcode is outside the specified range. 2. Replace the barcode.
26	**Rack Barcode Reader** Rack Barcode Reading Error	1	S. STOP	1. Check whether the barcode label is dirty. 2. Check whether the barcode is positioned correctly. 3. Check whether the barcode label is missing. 4. Check whether the barcode label has the correct type of code. 5. Contact Technical Support.

Table E-3 Instrument Alarms (messages) (continued)

Category	Alarm name Type of error	Subcategory	Level	Check and countermeasure
27	**Sample Barcode** Sample Barcode Label Error	1-5	WARNING	1. Check whether the barcode label is dirty. 2. Check whether the barcode is positioned correctly. 3. Check whether the barcode label is missing. 4. Check whether the barcode label has the correct type of code. 5. Contact Technical Support.
28	**Barcode Reader Comm.** Barcode Reader Error	1-30	S.STOP	1. Check whether the barcode label has the correct type of code. 2. Contact Technical Support.
29	**Reflectance ADC** ADC Reflectance Error	1	WARNING	1. Contact Technical Support.
		2-7	STOP	1. Contact Technical Support.
30	**SG ADC** ADC Specific Gravity Error	1	WARNING	1. Contact Technical Support.
		2-7	STOP	1. Contact Technical Support.
31	**CLA ADC** ADC Clarity Error	1	WARNING	1. Contact Technical Support.
		2-7	STOP	1. Contact Technical Support.
33	**Wavelength Setting?** Wavelength Error	2-10, 12	WARNING	1. Correctly certify the wavelength and correction value with the blank pad. 2. The subcategory codes represent the items listed as follows: Subcategory Item 2pH 3LEU 4NIT 5PRO 6GLU 7KET 8UBG 9BIL 10ERY 11COL 12CLA

Table E-3 Instrument Alarms (messages) (continued)

Category	Alarm name Type of error	Subcategory	Level	Check and countermeasure
34	**Reflectance Setting?** Reflectance Error	2-12	WARNING	1. Correctly ensure the reflectance value and correction value with the blank pad. 2. The subcategory codes represent the items listed as follows: Subcategory Item 2pH 3LEU 4NIT 5PRO 6GLU 7KET 8UBG 9BIL 10ERY 11COL 12CLA
35	**C Setting?** Compensation Error	2-10	WARNING	1. Correctly ensure the correction value with the blank pad. 2. The subcategory codes represent the items listed as follows: Subcategory Item 2pH 3LEU 4NIT 5PRO 6GLU 7KET 8UBG 9BIL 10ERY
36	**Print Order** Print Error	1-12	WARNING	1. Print order setting is incorrect. 2. Correct the print order setting.
37	**Control Position** Control Position Error	1-5	WARNING	1. Control level setting is incorrect. 2. Correct the position of the control sample.
38	**Parameter?** Parameter Error	1	WARNING	1. Contact Technical Support.

Table E-3 Instrument Alarms (messages) (continued)

Category	Alarm name Type of error	Subcategory	Level	Check and countermeasure
40	**Sample Barcode Reader** Sample Barcode Reading Error	1	STOP WARNING	1. Check whether the barcode label is dirty. 2. Check whether the barcode is positioned correctly. 3. Check whether the barcode label is missing. 4. Check whether the barcode label has the correct type of code. 5. Contact Technical Support.
41	**System I/F** System I/F Error	1-17 21-29 31-42	WARNING	1. Check the host connection and communication. 2. Switch off the analyzer, then restart the analyzer. 3. If the alarm re-occurs, create a backup file of the alarm trace data on a blank diskette by executing the FD write procedure on the [Alarm Trace] screen. 4. Contact Technical Support.
42	**Touch Panel I/F** Touch Panel I/F Error	1-17	S.STOP	1. Switch off the analyzer, then restart the analyzer. 2. If the alarm re-occurs, contact Technical Support.
		21-29, 31-34	STOP	1. Switch off the analyzer, then restart the analyzer. 2. If the alarm re-occurs, contact Technical Support.
43	**Memory Error** S Ram Error	1- 2	STOP	1. Switch off the analyzer, then restart the analyzer. 2. If the alarm re-occurs, create a backup file of the alarm trace data on a blank diskette by executing the FD write procedure on the [Alarm Trace] screen. 3. Contact Technical Support.
44	**Initialize FLASH Memory** Flash Memory Error	1	STOP	1. Switch off the analyzer, then restart the analyzer. 2. If the alarm re-occurs, create a backup file of the alarm trace data on a blank diskette by executing the FD write procedure on the [Alarm Trace] screen. 3. Contact Technical Support.

Table E-3 Instrument Alarms (messages) (continued)

Category	Alarm name Type of error	Subcategory	Level	Check and countermeasure
45	**Defragment Memory** Flash Memory Error	1	STOP	1. Switch off the analyzer, then restart the analyzer. 2. If the alarm re-occurs, create a backup file of the alarm trace data on a blank diskette by executing the FD write procedure on the [Alarm Trace] screen. 3. Contact Technical Support.
46	**Data Area full** Flash Memory Error	1-3	S. STOP	1. Remaining capacity of the routine sample data storage is 16 or less (subcategory 1) at Start. 2. STAT sample data storage is six or less (subcategory 2) at Start. 3. Control sample data storage is 10 or less (subcategory 3) at Start.
		4-6	WARNING	1. Remaining capacity of the routine sample data storage is 45 or less (subcategory 4) at Start. 2. STAT sample data storage is 27 or less (subcategory 6) at Start. 3. Execute the data delete procedure after backing up the old sample data to a diskette.
47	**FLASH Memory File open** Flash Memory Error	1-9	STOP	1. Switch off the analyzer, then restart the analyzer. 2. If the alarm re-occurs, create a backup file of the alarm trace data on a blank diskette by executing the FD write procedure on the [Alarm Trace] screen. 3. Contact Technical Support.
48	**FLASH Memory File read** Flash Memory Error	1-9	STOP	1. Switch off the analyzer, then restart the analyzer. 2. If the alarm re-occurs, create a backup file of the alarm trace data on a blank diskette by executing the FD write procedure on the [Alarm Trace] screen. 3. Contact Technical Support.

Table E-3 Instrument Alarms (messages) (continued)

Category	Alarm name Type of error	Subcategory	Level	Check and countermeasure
49	**FLASH Memory File write** Flash Memory Error	1-9	STOP	1. Switch off the analyzer, then restart the analyzer. 2. If the alarm re-occurs, create a backup file of the alarm trace data on a blank diskette by executing the FD write procedure on the [Alarm Trace] screen. 3. Contact Technical Support.
50	**FLASH Memory File delete** Flash Memory Error	1-9	STOP	1. Switch off the analyzer, then restart the analyzer. 2. If the alarm re-occurs, create a backup file of the alarm trace data on a blank diskette by executing the FD write procedure on the [Alarm Trace] screen. 3. Contact Technical Support.
51	**FLASH Memory** Flash Memory Error	1-10	STOP	1. If the alarm re-occurs, create a backup file of the alarm trace data on a blank diskette by executing the FD write procedure on the [Alarm Trace] screen. 2. Contact Technical Support.
52	**FLASH Memory Error** Flash Memory Error	1	WARNING	1. Switch off the analyzer, then restart the analyzer. 2. If the alarm re-occurs, create a backup file of the alarm trace data on a blank diskette by executing the FD write procedure on the [Alarm Trace] screen. 3. Contact Technical Support.
53	**No Floppy Disk** FDD Error	1	WARNING	1. Insert a diskette. 2. Format a diskette.
54	**FD Write Protect** FDD Error	1	WARNING	1. Insert a diskette. 2. Release write-protection on a diskette.
55	**FD Format** FDD Error	1	WARNING	1. Perform Clean FD Drive. 2. Perform Format FD.
56	**FD Cleaning** FDD Error	1	WARNING	1. Perform Clean FDD Drive. 2. If the alarm persists, contact Technical Support.
57	**Floppy Disk read** FDD Error	1-4	WARNING	1. Perform Clean FD Drive. 2. If the alarm persists, contact Technical Support.

Table E-3 Instrument Alarms (messages) (continued)

Category	Alarm name Type of error	Subcategory	Level	Check and countermeasure
58	**Floppy Disk write** FDD Error	1-5	WARNING	1. Perform Clean FD Drive. 2. If the alarm persists, contact Technical Support.
59	**Printer** Printer Error	1	WARNING	1. Check whether the printer is switched on. 2. Check whether there is paper in the printer. 3. Check the power supply and communication cable to the printer.
60	**TS Transfer Base Test Strip** Transfer Base Error	1	WARNING	1. Check the position of the test strip transfer base.
61	**Rack Transfer** Rack Crossfeed Line Error	1-3	STOP	1. Perform reset. 2. Use a different rack. 3. Contact Technical Support.
62	**W.Syringe** Wash Syringe Error	1-2	STOP	1. Perform the reset procedure. 2. If the condition cannot be restored to normal, contact Technical Support.
63	**Rack full** Rack Output Line Full	1	STOP	1. At Start/Reset: 2. Remove racks from the rack output tray in the rack transfer mechanism, and replace with an empty tray. 3. In Operation modes, other than Start/Reset: 4. Same as before (63-1).
		2	STOP	
		4	WARNING	1. At Restart (from S.STOP): 2. Same as before (63-1/2)
		5-6	STOP	1. Contact Technical Support.
		7	WARNING	1. Place the rack tray in position
64	**TS Set Error** Test Strip Cassette	1	WARNING	1. Execute the “Change cassette” procedure again from the [Maintenance] screen.
65	**Wash Error** Wash Error	1	WARNING	1. Execute the wash procedure again.
66	**Rack Tray** Rack Tray Error		WARNING	1. There is no rack tray on the output line. 2. Place an empty rack tray on the output line of the rack transfer mechanism.

Table E-3 Instrument Alarms (messages) (continued)

Category	Alarm name Type of error	Subcategory	Level	Check and countermeasure
67	**Sample Empty** No Sample Error	1	WARNING	1. No sample detected
68	**Rack ID?** Rack ID Error	1	STOP	1. Check rack ID label.
71	**Intensity?** Reflectance Error	1-7	STOP	1. Repeat calibration. 2. Contact Technical Support.
72	**Factory Calibration?** Factory Cal Error	1-5	STOP	1. Contact Technical Support.
73	**Calibration?** Calibration Error	1-2	STOP	1. Repeat calibration. 2. Use new calibration strip. 3. If calibration is unsuccessful after several attempts, contact Technical Support.
		3	WARNING	
74	**Test Strip** Reflectance Error	1	WARNING	1. Check if urine is very dark. If not, repeat measurement. 2. If alarm persists and urine samples are not dark, contact Technical Support.
		2-3	STOP	1. Repeat measurement. 2. Contact Technical Support.
78	**SG?** Specific Gravity Error	1-6	WARNING	1. Carry out wash procedure. 2. Contact Technical Support.
79	**SG Calibration?** Specific Gravity Calibration 1 Error	1-6	STOP	1. Check the position of the SG standard. 2. Repeat SG calibration. 3. Carry out wash procedure.
80	**SG Calibration Check?** Specific Gravity Calibration 2 Error	1-9	WARNING	1. Check the position of the SG standard. 2. Repeat SG calibration. 3. Carry out wash procedure.
81	**No SG Calib Data** Specific Gravity Calibration not done	1	WARNING	1. Execute SG calibration.
82	**Specific Gravity Calibration out of range** SG out of range	1	WARNING	1. Carry out wash procedure. 2. Execute calibration. 3. Contact Technical Support.
83	**SG?** Specific Gravity System Error	1	WARNING	1. Execute calibration. 2. Contact Technical Support.

Table E-3 Instrument Alarms (messages) (continued)

Category	Alarm name Type of error	Subcategory	Level	Check and countermeasure
84	**Clearance?** Clarity Error	1	WARNING	1. Carry out wash procedure. 2. Contact Technical Support.
85	**Clearance Sensitivity?** Clarity Error	1	WARNING	1. Carry out wash procedure. 2. Contact Technical Support.
86	C**learance Drift** Clarity Error	1	WARNING	1. Contact Technical Support.
91	**Barcode Reader Setting** Barcode Reader Parameter Error	1-2	STOP	1. Contact Technical Support.
92	**Rack Tray full** Output Rack Tray Full	1	S.STOP	1. Remove rack tray and sample racks from output buffer and set an empty tray.
101-134	**System Error**	1-34	E.STOP	1. Contact Technical Support.

Table E-3 Instrument Alarms (messages) (continued)

Appendix F

Part F describes the technical specifications relating to the URISYS 2400.

Technical specifications

This chapter contains all technical specifications.

In this chapter *Chapter* **10**

Technical specifications 2
Barcode specifications 3
Concentration ranges 5

Technical specifications

System description	Interface:	1 serial RS 232 C interface 1 parallel printer port	
	Display:	Color LCD touch screen	
	Printer:	External printer (for example, Fujitsu-DL 3700 Pro)	
Dimensions	Height:	67 cm (26.4 in)	
	Width:	53 cm (21 in)	
	Depth:	65 cm (26 in)	
	Weight:	85 kg (187 lbs)	
Power supply	Supply voltage:	100-240 V AC (50-60 Hz)	
	Power consumption:	0.2 kVA	
	Over-voltage category:	II	
	Protection class:	1	
	Pollution degree:	2	
	Fuses:	Littelfuse Inc. Type 218315, T 3.15A, 250V (2 pcs.)	
Heat dissipation		700 Kj (663 BTU)	
Operating conditions	Temperature:	Operating:	15 - 30°C (59 - 86°F)
		Storage and transport:	-20 - 60°C (-4 - 140°F)
		Stand by:	5-40°C (41 - 104°F)

Measurement methods

Test strip parameters	Type:	Reflectance photometry
	Light source:	LEDs (light-emitting diodes)
	Wavelengths:	470 nm, 555 nm, 620 nm
	Measuring head:	1 measuring head with 3x3 LEDs
Clarity (CLA)	Type:	Turbidimetry
	Light source:	LED
	Wavelength:	660 nm
	Detector:	Photodiode
Specific gravity (SG)	Type:	Refractometry
	Light source:	LED
	Wavelength:	650 nm
	Detector:	CCD element
Processing	Incubation time:	60 sec
	Cycle time:	15 sec

Barcode specifications

Item		Specification
Reading method		Scanning via LED and CCD sensor
Barcode symbol used		NW7 (Codabar), Code 39, ITF (Interleaved 2 of 5), Code 128
Check digit		Usable
	NW7	Modulus 16
	Code 39	Modulus 43
	ITF	Modulus 10/weight 3
	Code 128	Modulus 10/weight 3
Number of ID digits		
	NW7	3 to 13 digits (without check digit); 3 to 13 digits + 1 digit (check digit)
	Code 39	3 to 13 digits (without check digit); 3 to 13 digits + 1 digit (check digit)
	ITF	4 to 12 digits (without check digit); 3 to 13 digits + 1 digit (check digit)
	Code 128	4 to 12 digits + 2 digits (check digit)
Characters usable		
	NW7	0 to 9, -, /, $, +
	Code 39	0 to 9, space, A to Z, -, ., /, $, %, +
	ITF	0 to 9
	Code 128	Alphanumerical function characters and communication characters are excluded.



If using an ITF barcode system, Roche/Hitachi recommends its use only with a check digit function.

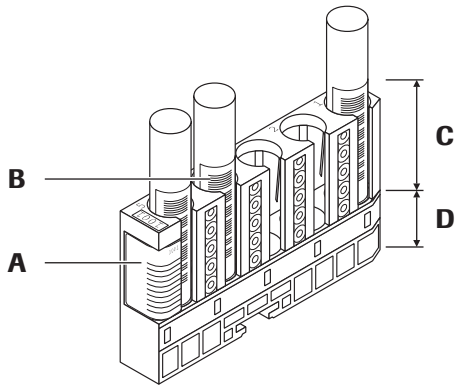

Figure F-1 Rack with barcode read zone

A *Rack barcode label*

B *Sample barcode label*

C *Scanned area (77 mm)*

D *Distance between rack edge and barcode label (35 mm)*

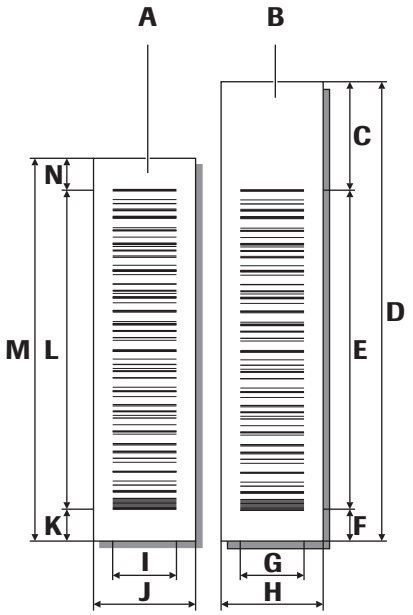

Figure F-2 Sample barcode labels

A *Sample barcode standard size*

B *Sample barcode actual label size*

C *17 mm*

D *72 mm*

E *50 mm*

F *5 mm*

G *13 mm*

H *16 mm*

I *13 mm*

J *16 mm*

K *5 mm*

L *50 mm*

M *60 mm*

N *5 mm*

Concentration ranges

Test parameters	Default value	
	Range (conventional)	**Range (SI)**
SG	1.000-1.050	1.000-1.050
PH	5.0	5.0
	6.0	6.0
	6.5	6.5
	7.0	7.0
	8.0	8.0
	9.0	9.0
LEU	NEG	NEG
	25 /µL	25 /µL
	100 /µL	100 /µL
	500 /µL	500 /µL
NIT	NEG	NEG
	POS	POS
PRO	NEG	NEG
	25 mg/dL	0.25 g/L
	75 mg/dL	0.75 g/L
	150 mg/dL	1.50 g/L
	500 mg/dL	5.00 g/L
GLU	NORM	NORM
	50 mg/dL	3 mmol/L
	100 mg/dL	6 mmol/L
	300 mg/dL	17 mmol/L
	1000 mg/dL	56 mmol/L
KET	NEG	NEG
	5 mg/dL	0.5 mmol/L
	15 mg/dL	1.5 mmol/L
	50 mg/dL	5.0 mmol/L
	150 mg/dL	15.0 mmol/L
UBG	NORM	NORM
	1 mg/dL	17 µmol/L
	4 mg/dL	68 µmol/L
	8 mg/dL	135 µmol/L
	12 mg/dL	200 µmol/L

Table F-1 Range values for all tests

Test parameters	Default value	
	Range (conventional)	**Range (SI)**
BIL	NEG	NEG
	1 mg/dL	17 µmol/L
	3 mg/dL	50 µmol/L
	6 mg/dL	100 µmol/L
ERY	NEG	NEG
	10 /µL	10 /µL
	25 /µL	25 /µL
	50 /µL	50 /µL
	150 /µL	150 /µL
	250 /µL	250 /µL
COL	P.YEL	P.YEL
	YELLO	YELLO
	AMBER	AMBER
	BROWN	BROWN
	ORANG	ORANG
	RED	RED
	GREEN	GREEN
	OTHER	OTHER
CLA	CLEAR	CLEAR
	L.TRB	L.TRB
	TURBD	TURBD

Table F-1 Range values for all tests (continued)

Glossary and index G

Glossary

A

Analyte see Urine analyte.

Analyzer The URISYS 2400 instrument.

Arbitrary units Result classification using 1+, 2+, 3+ classes instead of numerical concentration results.

B

Backup The saving of data onto storage media, such as diskettes, other than that of the main storage (hard disk). If this data is required again, it can be restored from the backup copy.

Barcode A numeric or alphanumeric code used on sample tubes and racks for sample and rack identification.

Barcode type The URISYS 2400 can read different sample barcode types: Code39, NW7 (Codabar), ITF, and Code 128.

Blanking Setting the water transmission of the flow cell to 100% before each measurement of the urine clarity.

C

Calibration To adjust the reflectance photometer to a gray standard (calibration strip) with known reflectance values.

Calibration strip Gray plastic strip used for calibrating the photometer of the URISYS 2400analyzer.

Charge-coupled device (CCD) Photoelectrical detector used in the URISYS 2400 to determine the angle of total reflection of light for the measurement of the specific gravity of the urine sample.

Check digit (C/D) Barcode verification number.

Clarity (CLA) Feature of urine samples determined by measurement of the percentage value of light transmission. Results can be CLEAR, LIGHT TURBID, or TURBID.

Code39 A barcode type for sample tubes that can be read by the barcode reader.

Color (COL) Feature of urine samples determined by measurement of the compensation pad on the test strips.

Color development Color change that occurs on the test pads of the test strip as a result of a chemical reaction with the urine analyte.

Compensation pad A blank pad on the test strip used for the determination of the urine color and for the prevention of false positives when a urine sample is strongly colored.

Cross-feed line Rack transport line that moves racks from the input line along the barcode reader and the sampling position to the output line.

D

Data alarms Symbols that indicate values outside a specified range or an abnormality in sample or test strip processing.

Diskette An MS-DOS compatible 3.5-inch diskette used for the storage of data and programs.

E

Expiration date For test strip cassettes, the date after which the contents must not be used in analytical tests. Also applies to calibration strips and to controls.

F

Flow cell A component in the URISYS 2400 analyzer used to measure specific gravity and clarity.

H

Host computer A central computer that communicates with the URISYS 2400 receiving sample results from the analyzer.

Host connection The connection (via a cable) between the analyzer and the host computer. The operator can either activate or deactivate this connection, as required.

I

ITF A barcode type for sample tubes and racks that can be read by the barcode reader.

L

Light-emitting diode (LED) A semiconductor that emits light of a defined wavelength.

M

Maintenance procedures Procedures that must be performed on a regular basis for example daily, weekly, monthly, or every three months to secure reliable operation of the analyzer.

Menus Parts of the software program that serve for dedicated user operations, for example, setting of parameters.

Message (alarm) Information on the touch screen of sample or test strip errors, or reasons for the analyzer stopping.

N

Nomogram Correlation function between quantities. In the URISYS 2400 analyzer, the refraction/gravity function used to convert the measured refraction values into specific gravity results.

NW7 A barcode type for sample tubes that can be read by the barcode reader.

O

Operation status The analyzer processes samples in this status. Additional samples can be loaded and measured without an intermediate stop of the analyzer.

P

Parallel interface The interface (Centronics type) through which the analyzer can be connected to an external printer.

Parameters System and analysis configurations that can be set individually (and stored) according to customer requirements if they deviate from the default factory settings.

Parameter-specific reflectance values Reflectance ranges stored in the analyzer that are used to convert the reflectance values of each test pad into semi-quantitative concentration results.

Password-protected See Special functions.

Photodiode detector A photometer component that receives the reflected light.

Photometer An optical device (measuring head) that measures the intensity of reflected light of each test pad.

Print mode Software function in the [Start Condition] screen to select the category of results (all, abnormal, sieve, or normal) to be printed in real time.

Q

Qualitative determination The measurement of analytes or features with descriptive (qualitative) result classifications such as negative/positive, clear/turbid, or yellow, amber and so on.

R

Racks Roche Diagnostics 5-position standard racks that must be used to carry sample tubes into the analyzer.

Rack tray Trays for loading racks onto the analyzer and removing processed racks from the analyzer.

Rack ID label All racks must have a barcode for identification of the rack (routine, controls, or wash samples) and for retrieving samples after serial measurements.

Range table Table that assigns reflectance values (obtained from test strip pads) or transmissions (clarity) to concentrations or qualitative results.

Reflected light intensity The amount of light that is reflected from the test pad and measured by the photodiode detector.

Reference plate Internal gray plastic plate that is measured first and used as a reference for the reflectance measurements of the test strip pads.

Reflectance value Portion of reflected light, calculated by the microprocessor and expressed as a percentage.

Rinse station The area into which excess urine is ejected and where the needle is washed with water before the next sample is taken.

S

Sampling Stop Status The status of the analyzer changes to Sampling Stop or S.Stop when there are no more racks on the rack input line or when the analyzer cannot continue with sampling.

Semi-quantitative determination Measurement of analytes or features with numerical result classifications.

Sequence number Consecutive number assigned to each sample and that is increased automatically with each measurement.

Special functions Analyzer software functions that are password-protected to avoid accidental modifications.

Specific gravity The ratio of the density of urine to the density of water.

Specific gravity calibration This calibration is based on the measurement of calibration solutions of known refractive indices.

Start conditions Before starting analysis, certain conditions can be confirmed or changed using the [Start Condition] screen, such as starting sequence number, operator ID, host ON/OFF line, and print mode.

STAT sample An emergency sample that can be measured in-between a run of routine samples with priority by using the STAT function on the [Routine Monitor] screen.

Stand-By status The non-operational status, which follows Stop, that the analyzer must always be in for the processing of data, inputting of criteria, or the setting of parameters.

Strip waste container A container located on the right side of the analyzer in which used test strips are deposited.

System parameters Analyzer settings that can be selected by the operator such as barcode setup, host communication parameters, and others.

T

Test parameters (1) Software menu for the definition of parameters related to sample analysis and result reporting. (2) Parameters of the test strip itself, such as glucose, protein, and so on.

Test strip Chemical reagent strip containing ten individual test pads that are used to test for different analytes or features of urine or control samples.

Toggle function Function of a button on the touch screen to call up different settings.

Touch screen An interactive screen designed to make navigation through the menus and input of data and settings consistent and convenient. Also known as user interface screen.

TS transfer base A component of the URISYS 2400 analyzer on which test strips are wetted with the sample, incubated, transferred to the photometer, and measured.

U

Urinalysis system A system consisting of an analyzer and reagents (test strips), designed for the chemical analysis of urine samples.

Urine analytes The constituents in the urine sample whose concentrations are to be determined.

URISYS 2400 cassette An innovative cassette manufactured by Roche Diagnostics for the most convenient loading of test strips onto the URISYS 2400 analyzer, supporting its fully automated operations.

User interface screen See Touch screen.

W

Water supply tank This tank is located externally and supplies deionized water to the analyzer. It has a maximum capacity of 5 liters (5.3 quarts). This is enough to process approximately 1000 samples.

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